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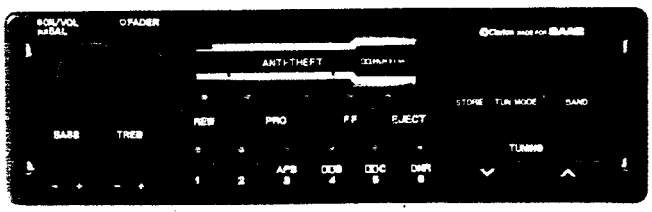
clarion Service Manual

Published by Service Administration Section



SAAB Automobile Genuine
AM Stereo, FM Stereo
Cassette Tuner
Model PU-9206A

■SPECIFICATIONS:

(The specifications for this product were determined and are presented in accordance with specification standards established by the Ad Hoc Committee of Car Stereo Manufacturers.)

General

Power supply voltage: DC 14.4V
(10.8 to 15.6V allowable)
Current consumption: Less than 3A
Weight: 1.6kg
Dimensions: Width 189mm
Height 59mm
Depth 150mm

FM Section

Frequency range: 87.9MHz to 107.9MHz
Usable sensitivity: 13dBf (1.1μV./75 ohms)
50dB Quieting sensitivity:
18dBf (2.0μV./75 ohms)
Alternate channel selectivity:
60dB
Frequency response: 30Hz to 15,000Hz, ±3dB

AM Section

Frequency range: 530kHz to 1,620kHz
Usable sensitivity. (20dB S/N): 28μV

Tape Section

Tape speed: 4.75cm/s. (1-7/8 ips)
Wow & Flutter: 0.13% (W.R.M.S.)
Signal/Noise ratio: 120μs(normal)/Dolby B/
Dolby C
53dB/61dB/69dB
Frequency response: 120μs(normal)
50Hz to 14,000Hz(±3dB)

Audio Section

Line output voltage: 150mV into 10k ohms
(adjustable)

- Dolby Noise Reduction System manufactured under license from Dolby Laboratories Licensing Corporation.
- Dolby and the double-D symbol are trademarks of Dolby Laboratories Licensing Corporation.

■FEATURES:

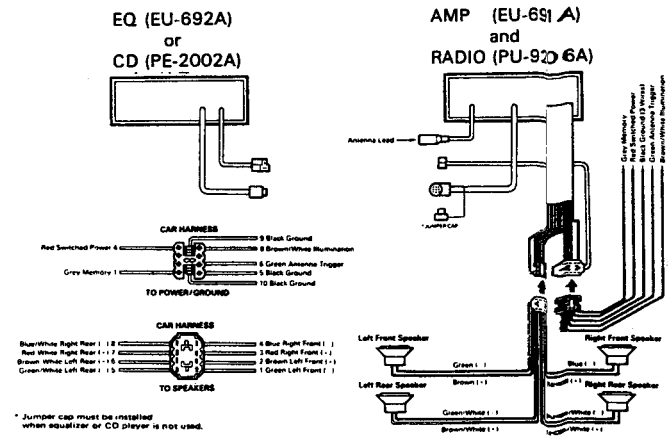
- Full logic tape transport.
- AM stereo.
- Auto reverse with dual direction automatic azimuth adjustment.
- Motorized load/eject.
- Dolby B/C noise reduction.
- Unit removable from dash.
- Anti-Theft System.
- APS (Automatic Program System).
- Eject capability with key off (Key off pinch roller release).
- Automatic 70μs tape equalization selector.
- Automatic Antenna Circuit.

■COMPONENTS:

- **PU-9206A-A**

Main unit		1
Parts bag	921-8430-00	1
Removal Tool	341-1363-00	1
Vinyl Holder	348-0151-00	1

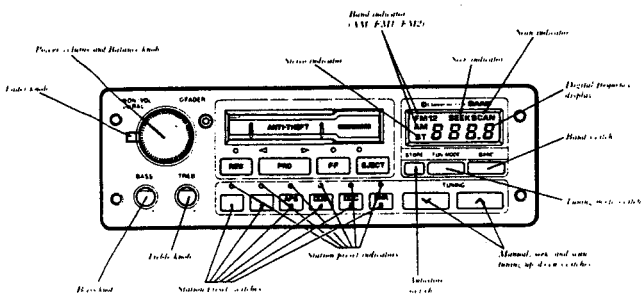
■WIRING DIAGRAM:



■OPERATION:

N.B.
When using the seven-band graphic equalizer, the bass and treble settings should be left in the center click stop position.

■TUNER OPERATION



Tuning

Use the Tuning Mode switch to select manual, seek, or scan tuning. The frequency display will indicate both seek and scan modes. A blank display indicates manual mode.

Manual tuning is accomplished by pressing the ∨ or ∧ switches. The ∨ switch lowers the frequency. The ∧ switch raises the frequency.

In the Seek Tuning mode, the radio automatically seeks out the next clear station when the ∨ or ∧ switch is depressed. Use the ∨ switch to seek the next clear lower frequency station, the ∧ switch to seek the next clear higher station.

Scan Tuning is started by pressing either the ∨ or ∧ switches. The radio will automatically scan for the next medium to strong frequency and play for a few seconds before continuing on to the next. Scanning can be stopped at any desired station simply by pressing the same switch again during the pause.

Station Presets

You can preset up to 18 stations—six on each of the three indicated bands. Once you know which stations you'll enjoy listening to regularly, you can use the preset function to summon them instantly.

First, use the BAND switch to select the AM, FM1 or FM2 band. Note that FM1 and FM2 both represent the regular FM band. The duplicate listing merely allows you to store six FM stations on one band, and six different FM stations on the other.

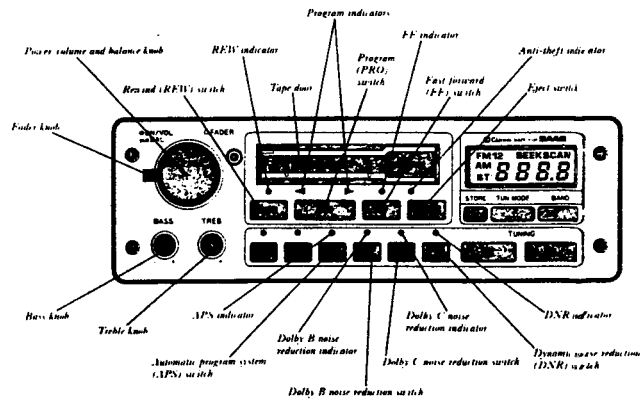
Using the manual mode, select the first station to be preset. Generally, this will either be the station you listen to most often or the first station on the dial that you listen to frequently. Use whatever sequence is easy for you to remember. To enter this station in memory, depress and hold the No. 1 memory preset switch. An indicator will illuminate above the switch you have preset. While this switch is held, you will hear the volume decrease and then return to its original level. When it returns to its original level, release the switch and that station is memorized. Turn to the next station you want memorized and repeat the procedure on the next preset switch. To call up a memorized station, simply tap the appropriately numbered memory preset.

Auto Store

If you are driving in an unfamiliar area—and thereby lose the stations you generally listen to—you can use the auto store function to find and memorize the strongest stations in the area which you're driving. To activate the auto store function, depress the Auto Store (STORE) switch for two seconds. In this mode the radio will automatically scan the entire frequency band (AM if on AM, FM if on FM). Six stations with strong signal strength will be stored in the radio's memory. If six strong stations cannot be found, weaker stations will be chosen. The auto store function will only store six stations at one time—six on AM or six on FM.

If you use the auto store function, you will lose the stations that had previously been programmed into memory. They can be reset when you are again driving in your local area.

■CASSETTE TAPE OPERATION



Fast Forward or Rewind

Fast forward or rewind is accomplished by pressing the FF or REW switch. It is not necessary to hold the switch while the tape is fast forwarding or rewinding. The appropriate indicator will illuminate above the switch.

N.B.
–To release the cassette from fast forward, press the FF switch again. To stop the cassette from rewinding, press the REW switch again.

– If the tape is wound completely in the FF mode, it will stop automatically and play the opposite side. If the tape is wound completely in the REW mode, it will stop automatically and play the same side.
– If the tape is in the FF or REW mode and the Program switch is pressed, the tape will stop and begin to play in the opposite direction.

Automatic Program System (APS)

This feature provides still more flexibility. It allows you to repeat the selection you are currently listening to or jump ahead to the next selection before the current one is finished.

To repeat the selection that is currently playing, tap the APS switch (the APS indicator will light) and the cassette rewind (REW) switch.

To jump to the next selection, tap APS and the cassette fast-forward (FF) switch.

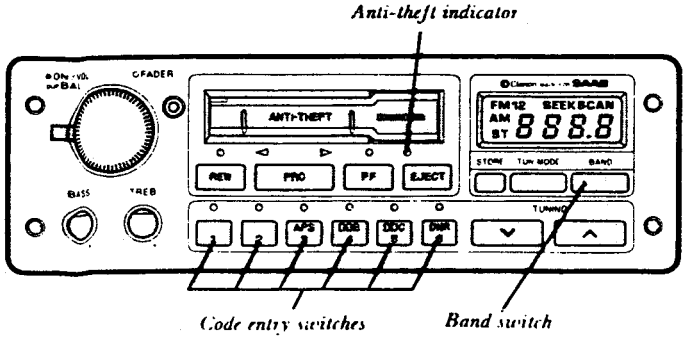
N.B. : The APS system may occasionally the "fooled" by the long low-level passages in classical music, since these resemble the silent gaps between selections.

Tape Equalization

There are several different types of tape currently in use, and Automatic Tape Equalization is provided to enable you to match their playback characteristics for the best sound. Most tapes have a normal equalization of 120μs (normal bias). Unless there is some indication to the contrary—such as the designations "metal," "chrome" or "70μs" (high bias)—you can assume that the tape requires normal equalization and the unit will select the normal mode. However, high-performance metal and chrome cassettes (as well as ferrichrome, an infrequently used tape type) require a different equalization. In this case the unit will select the high-bias position.

There is one important exception: Many prerecorded cassettes today use chrome tape for improved performance with normal bias (120μs) equalization. In this case the unit will not select high-bias.

■ANTI-THEFT SYSTEM (ELECTRONIC LOCK-OUT SYSTEM)



The unit already has code numbers from the factory, and then ascertaining this code numbers, please submit next procedure.

1. Turn on the ignition.
2. Turn on the radio.
3. Key in your code numbers using the station preset keys (1–6). The unit will operate.

If you make a mistake while entering your code, finish entering all four digits. Press and hold the BAND switch until CODE reappears on the display. Then enter the correct code.

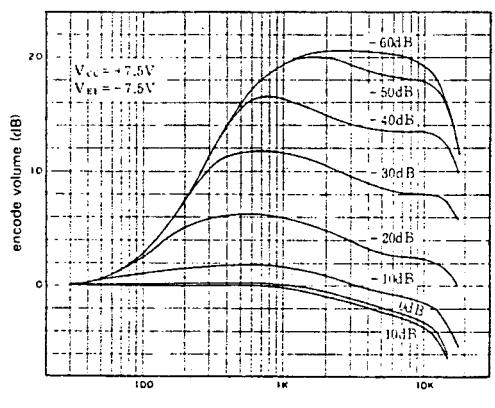
Your radio also has a built-in flashing light which indicates to outside viewers that it contains an electronic Anti-Theft System When your ignition is turned off, this light will flash. It will not flash when the ignition is turned on. If you think it is necessary to turn off the flashing light, it can be done manually. Press and hold the BAND switch until the light goes out. This light will automatically be turned on again after the ignition has been turned on and off.

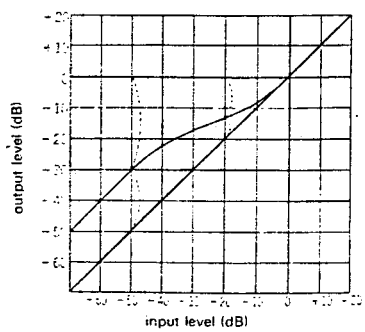
● Dolby C NR

Dolby system is a device to decrease the noise generated by tapes (hiss noise). Conventional type "B" decreases the noise in high toned region by 10dB, but noise is decreased by −20dB at maximum in the medium and high toned region in "C". SN ratio is better than "B".

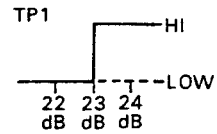
Dolby C works as a linear AMP for the input level over 0dB as well as "B", but for the smaller input level than 0dB, compression ratio changes according to the input level When it is less than −50dB, noise is compressed by 20dB at maximum. In the low toned region (about less than 100Hz) noise is not compressed regardless of the input level Compression ratio changes as the frequency gets high. This is to hold down the influence-to the medium-low toned region by the saturation of high toned signals At the low level of this band, noise is not obvious because hearing sensitivity is decreased

C type. encode characteristics





■ADJUSTMENT:

Adjustment item	Adjustment point	Procedure
0V	IFT2	1. Connect the digital voltmeter to TP2 and TP3. 2. Input the 98.1MHz/55dB signal and adjust the reading of digital voltmeter to 0±50mV by IFT2.
SD	VR1	1. Input the 98.1MHz/23dB signal. 2. Adjust VR1 so that the voltage of TP1 is in the range LOW to HI. 
SASC	VR3	1. Input the 98.1MHz/65dB, 7kHz modulation frequency, 30% modulation degree SSG signal, and then turn on ST. SW. 2. Adjust the output level of the volume controller to 0dBm (0.775V). 3. Set the SSG output to 38dB and adjust VR3 so that the output level is −3dB.
Separation	VR1 (880-0304A)	1. Input the 98.1MHz, connect the output of a stereo modulator to the external modulation terminal, and input a 65dB SSG signal. 2. Set the stereo modulator to the L or R ch and adjust VR1 so that the maximum separation is obtained.
Pilot canceller	VR2 (880-0304A)	1. Input the 98.1MHz/65dB, modulation (PL 10%). 2. Adjust VR2 so that output of the set is minimum.
Dolby NR	VR301 and VR302	Insert a Dolby level test tape (400Hz−200nWb/m), connect the milli-volt meter to TP17 and TP44, and adjust VR301 and VR302 to obtain an output of 245mV.

<TAPE MECHANISM>

1. Head-azimuth Adjustment

Make playback for the azimuth-tape (8kHz, −10VU), and turn each azimuth-adjusting screw to make each FWD & REV maximum. After adjustment, make adhesion with bond.

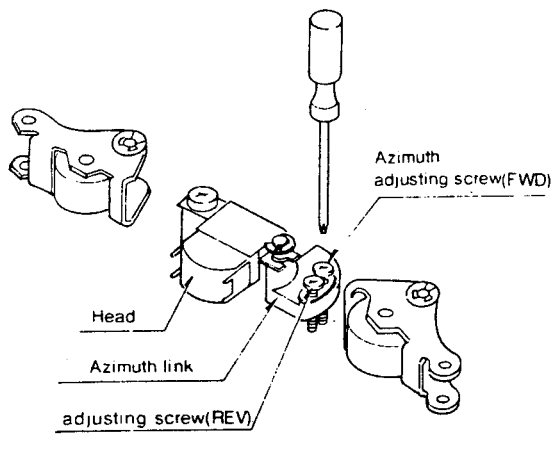


Fig. 1

2. Adjustment of Adsorption Plunger B

Under FF-operation, when adsorption plunger is released, mount the plunger to make the adsorption-surface of adsorption plunger B in parallel to the bent surface of plunger link B, and make adhesion of the rear side of the screw with bond.

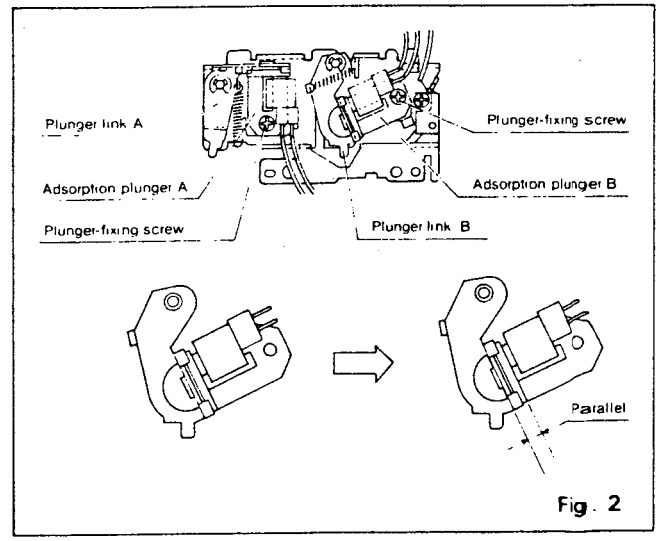


Fig. 2

3. Adjustment of Adsorption Plunger A

Under REW-operation, when adsorption plunger is released, mount the plunger to make the adsorption-surface of adsorption plunger A in parallel to the bent surface of plunger link A, and make adhesion of the rear side of the screw with bond.

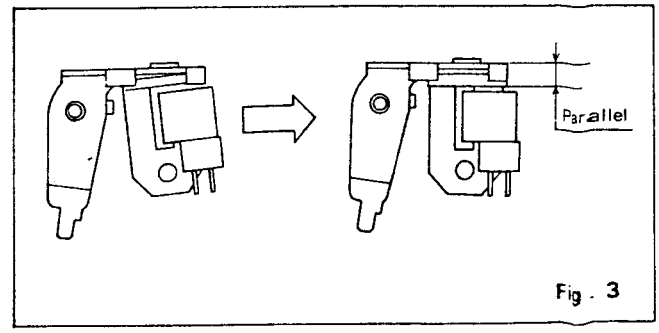


Fig. 3

■EXPLANATION OF IC's:

Refer to description in IC service manual vol 1.			
LA2110	051-0407-00	FM Noise Canceller	P17
LM1894N	051-0485-00	Dynamic Noise Reduction	P25

Refer to description in IC service manual vol 2.			
LA3430	051-0733-01	FM MPX	P9
HA12438FP	051-0730-00	FM Frontend	P7
TMP42C70N8005	051-0740-01	Cassette Mechanism Controller	P83
TA7411AP	051-0798-20	FM IF System	P8
NJM4558M	051-0350-55	Dual OP. Amp	P39
NJM2058M	051-0556-01	Quad OP. Amp	P41
AN6263N	051-0561-01	Music Interval Detection	P42
TA7705P	051-0714-00	Dual Preamp	P18
CXA1097Q	051-0830-00	Stereo Dolby Noise Reduction	P20

■MC13020P 051-0630-00 MOTOROLA CQUAM ® AM STEREO MC13020P 051-0630-01 DECODER

NOTE : 051-0630-01 is useful instead of 051-0630-00.

This circuit is a complete one-chip full-feature AM stereo decoding and pilot detection system It employs full-wave envelope signal detection at all times for the L+R signal, and decodes L−R signals only in the presencs of valid stereo transmission

- No Adjustments, No Coils
- Few Peripheral Components
- True Full-Wave Envelope Detection for L+R
- PLL Detection for L−R
- 25Hz Pilot Presencs Required To Receive L−R
- Pilot Acquisition Time 300ms For Strong Signals, Time Extended For Noise Conditions To Prevent "Falsing"
- Internal Level Detector Can Be Used As AGC Source

MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Supply Voltage	V_{CC}	14	Vdc
Pilot Lamp Current, Pin 15		50	mAdc
Operating Temperature	T_A	−40 to +85	°C
Storage Temperature	T_{stg}	−65 to +150	°C
Junction Temperature	T_J(max)	150	°C
Power Dissipation Derate above 25°C	P_D	1.25 10	W mW/°C

ELECTRICAL CHARACTERISTICS

(V_{CC}=8.0Vdc, T_A=25°C, Input Signal=200mVRMS Unmodulated Carrier, Circuit Of Figure 1 Unless Otherwise Noted.)

Characteristic		Min	Typ	Max	Unit
Power Supply Operating Range		—	8.0 – 12.0	—	Vdc
Supply Line Current Drain, Pin 6		20	30	45	mAdc
Input Signal Level Unmodulated, Pin 2, for Full Operation		100	200	357	mVRMS
Audio Output Level, 50% Modulation L only or R only		160	220	280	mVRMS
Audio Output Level, 50% Modulation Monaural		80	110	140	mVRMS
Output THD, 50% Modulation Monaural Stereo			0.5 1.0	1.5 3.0	%
Channel Separation, L only or R only, 50% Modulation		4.22	30	—	dB
Pilot Acquisition Time VCO locked after release of forced monaural		—	300	—	ms
Input Impedance	R_{in}	20	27	—	kΩ
	C_{in}	—	6.0	—	pF
Output Impedance		—	100	150	Ω
Level Detector Filter Voltage, Pin 4	0 signal	1.4	1.7	2.0	Vdc
	200 mVRMS Signal	—	2.5	—	
Lock Detector Filter Voltage, Pin 10	In Lock	—	7.8	—	Vdc
	Out of Lock	—	0.8	—	
Force to Monaural, Pin 9, Pull Down for Monaural Mode		2.0	2.5	—	Vdc
		—	0.15	1.0	μA
Force to Monaural, Pin 9, Pull Up for Automatic Mode		—	3.5	5.0	Vdc
		—	0.001	1.0	μA

Fig. 1 – TYPICAL APPLICATION

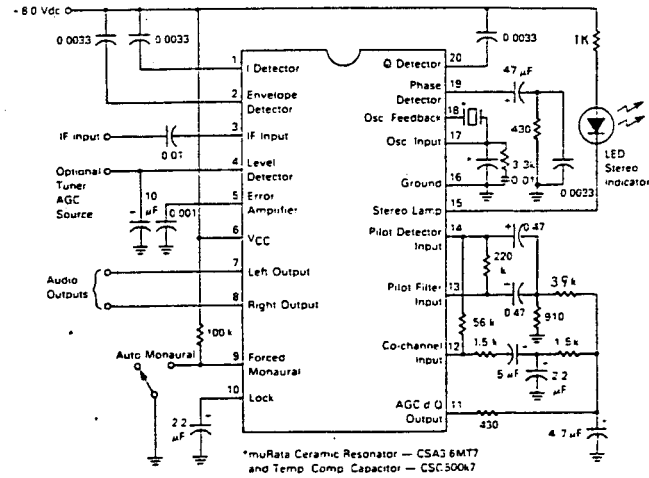


Fig. 2 – BASIC QUADRATURE AM (QUAM)

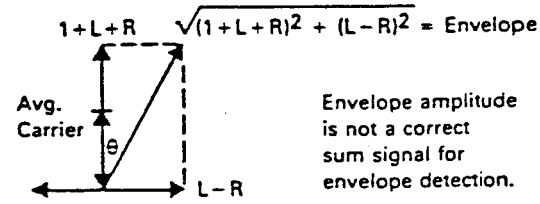


Fig. 3 – MOTOROLA CQUAM®

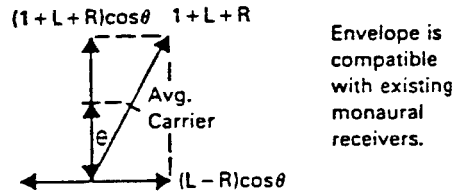
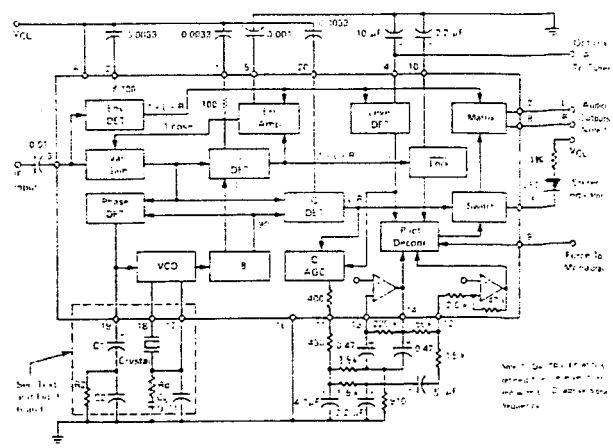


Fig. 4 – BLOCK DIAGRAM



MOTOROLA CQUAM ® – COMPATIBLE QUADRATURE AM STEREO

INTRODUCTION

In CQUAM®, conventional quadrature amplitude modulation has been modified by multiplying each axis by cosθ as shown in Figures 2 and 3 The resulting carrier envelope is 1+L+R, i.e., a correct sum signal for monaural receivers and for stereo receivers operating in monaural mode A 25Hz pilot signal is added to the L-R information at a 4% modulation level

THE DECODER

The MC13020P takes the output of the AM IF amplifier and performs the complete CQUAM R decoding function In the absence of a good stereo signal, it produces an undegraded monaural output Note in Figure 4 that the L+R information delivered to the output always comes from the envelope detector (Env DET).

The MC13020P decodes the stereo information by first converting the CQUAM R signal to QUAM, and then detecting QUAM The conversion is accomplished by comparing the output of the Env DET and the I DET in the Err AMP This provides the 1/cosθ correction factor, which is then multiplied by the CQUAM R incoming signal in the Var Gain block. Thus, the output of the Var Gain block is a QUAM signal, which can then be synchronously detected by conventional means The I and Q detectors are held at 0° and 90° relative demodulation angles by reference signals from the phase-locked, divided-down VCO The output of the I DET is 1−L+R, with the added benefit (over the Env DET) of being able to produce a negative output on strong co-channel or noise interference This is used to tell the Lock circuit to go to monaural operation The output of the Q DET is the L−R and pilot information

THE VCO

The VCO operates at 8 times the IF input frequency, which ensures that it is out-of-band, even when a 260kHz IF frequency is used Typically a 450kHz IF frequency is used with synthesized front ends This places the VCO at 3.6MHz, which permits economic crystal and ceramic resonators A crystal VCO is very stable, but cannot be pulled very far to follow front-end mistuning Pull-in capability of = Hz at 450kHz is typical, and de-Q-ing with a resistor (see Figure 7) can increase the range only slightly Therefore, the crystal approach can only be used with very accurate, stable front-ends By comparison, ceramic and L−C VCO circuits offer pull-in range in the order of =2.5kHz (at 450kHz) Ceramic devices accurate enough to avoid trimming adjustment can be obtained with a matched capacitor for Cs (see Figures 1 and 5)

In the PLL filter circuit on Pin 19, C1 is the primary factor in setting a loop corner frequency of 8−10Hz, in-lock An internally controlled fast pull-in is provided R2 is selected to slightly overdamp the control loop, and C2 prevents high frequency instability

The Level DET block senses carrier level and provides an optional tuner AGC source It also operates on the Q AGC block to provide a constant amplitude of 25Hz pilot at Pin 11, and it delivers information to the pilot decoder regarding signal strength

PILOT AND CO-CHANNEL FILTERS

The Q AGC output drives a low pass filter, made up of 400Ω internal, and 430Ω and 4.7μF external From this point, an active 25Hz band-pass filter is coupled to the Pilot Decoder, Pin 14, and another low-pass filter is connected to the Co-channel Input, Pin 12 A 2:1 reduction of 25Hz pilot level to the Pilot Decode circuit will cause the system to go monaural, with the components shown Refer to Figure 8 for the formulas governing the active band-pass filter The co-channel input signal contains any low frequency intercarrier beat notes, and, at the selected level, prevents the Pilot Decode circuit from going into stereo The co-channel input, Pin 12 gain can be adjusted by changing the external 1.5k resistor. The values shown set the "trip" level at about 7% modulation The 25Hz pilot signal at the output of the active filter is opposite in phase to the pilot signal coming from the second low-pass filter The 56k resistor from Pin 14 to Pin 12 causes the pilot to be cancelled at the co-channel input This allows a more sensitive setting of the co-channel trip level

THE PILOT DECODER

The Pilot Decoder has two modes of operation When signal conditions are good, the decoder will switch to stereo after 7 consecutive cycles of the 25Hz pilot tone When signal conditions are bad, the detected interference changes the pilot counter so as to require 37 consecutive cycles of pilot to go to stereo In a frequency synthesized radio, the logic that mutes the audio when tuning can be connected to Pin 9 When this pin is held low it holds the decoder in monaural mode and switches it to the short count This pin should be held low until the synthesizer and decoder have both locked onto a new station A 300ms delay should be sufficient If the synthesizer logic does not provide sufficient delay, the circuit shown in Figure 9 may be added Once Pin 9 goes high, the Pilot Decoder starts counting If no pilot is detected for seven consecutive counts, it is assumed to be a good monaural station and the decoder is switched to the long count This reduces the possibility of false stereo triggering due to signal level fluctuation or noise If the PLL goes out of lock, or interference is detected by the co-channel protection circuit before seven cycles are counted, the decoder goes into the long count mode Each disturbance will reset the counter to zero The Level Detector will keep the decoder from going into stereo if the IF input level drops 10dB, but will not change the operation of the pilot counter

Once the decoder has gone into the stereo mode, it will go instantly back to monaural if either the lock detector on Pin 10 goes low, or if the carrier level drops below the preset threshold Seven consecutive counts of no pilot will also put the decoder in monaural In stereo, the co-channel input is disabled, and co-channel or other noise is detected by negative excursions of the I DET, as mentioned earlier When these excursions reach a level caused by approximately 20% modulation of co-channel, the lock detector puts the system in monaural, even though the PLL may still actually be locked This higher level of co-channel tolerance provides the hysteresis to prevent chattering in and out of stereo on a marginal signal

When all inputs to the Pilot Decode block are correct, and it has completed its count, it turns on the Switch, sending the L−R to the Matrix, and switches the pilot lamp pin to a low impedance to ground

SUMMARY

It should be noted that in CQUAM R, with both channels AM modulated, the noise increase in stereo is a maximum of 3.0dB, less on program material. Therefore, this is not the major concern in the choice of monaural to stereo switching point as it was in FM, and blend is not needed

PIN DESCRIPTIONS

Pin 1, 2 – Detector Filters, Rout = 4.3k, recommend 0.0033μF to Vcc to filter 450kHz components
Pin 3 – IF Signal Input
Pin 4 – Level Detector filter pin, Rout = 8.2k, 10μF to ground sets the AGC time constant. High impedance output, needs buffer
Pin 5 – Error Amp compensation to stabilize the Var Gain feedback loop
Pin 6 – Vcc 6−12Vdc, suitable for low Vbatt automotive operation, but must be protected from "high line" condition
Pin 7, 8 – Left and Right Outputs, NPN emitter followers
Pin 9 – Forced Monaural, MOS or TTL controllable
Pin 10 – Lock detector filter, Rout = 27k, recommend 2.2μF to ground.
Pin 11 – AGC'd Q output, NPN emitter follower with 400Ω from emitter to Pin 11
Pin 12 – Co-channel Input, 1.5k series in and 56k feedback
Pin 13 – Pilot Filter Input to op amp, see Figure 8
Pin 14 – Pilot Decode Input (op amp output) emitter follower, Rout = 100Ω
Pin 15 – Stereo Lamp, open-collector of an NPN common emitter stage, can sink 50mA, Vsat = 0.3V at 5.0mA
Pin 16 – Ground
Pin 17 – Oscillator input, Rin = 10k, do not do connect to Pin 18 or ground
Pin 18 – Oscillator feedback, NPN emitter, Rout = 100Ω
Pin 19 – Phase Detector Output, current source to filter
Pin 20 – Detector Filter, Rout = 4.3k, recommend 0.0033μF to Vcc to filter 450kHz

Fig. 5 – CERAMIC VCO

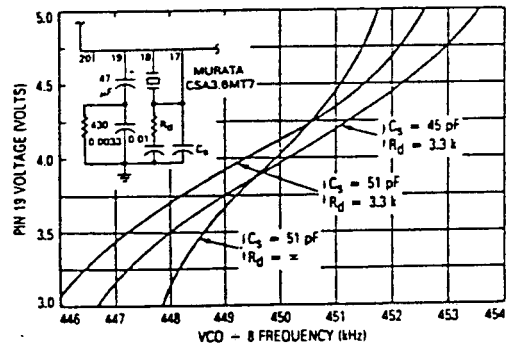


Fig. 6 – L−C VCO

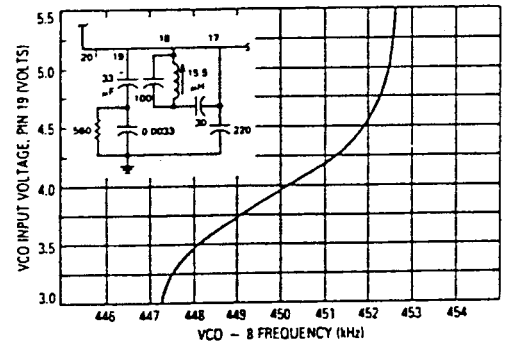


Fig. 7 – CRYSTAL VCO

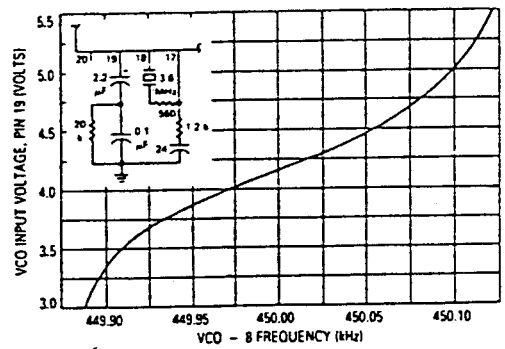
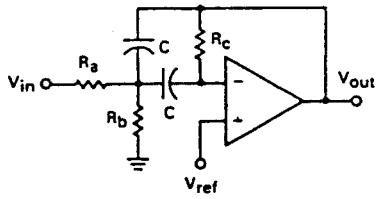


Fig. 8 – ACTIVE BAND-PASS FILTER



$$R_c = \frac{Q}{\pi f_o C}$$

$$R_a = \frac{R_c}{2 A_o}$$

$$R_b = \frac{R_a R_c}{4Q^2 R_a - R_c}$$

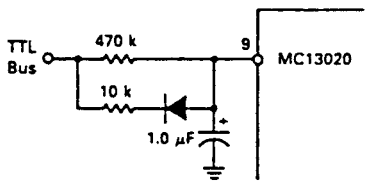
where, in this application
f_o = center frequency = 25Hz
A_o = gain at $f_o \leqslant 35$
$Q \leqslant 10$

Choose values for F_o, A_o, Q, and convenient C, solve for resistors

C ± 5%	Ra ± 5%	Rb ± 1%	Rc ± 1%
0.47μF	3.9k	910	220k
0.33μF	6.8k	1.3k	330k

Note : Capacitor C should be a good grade, low ESR.

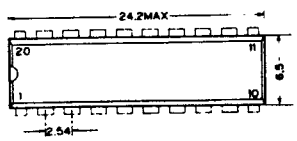
Fig. 9 – FORCED MONAURAL OPTIONAL DELAY CIRCUIT



■LA1135 051-0634-00 LA1135B 051-0634-01 AM Tuner

The part of electric specification is different between 051-0634-00 and 051-0634-01
(Output level for signal meter output)

Outward Form



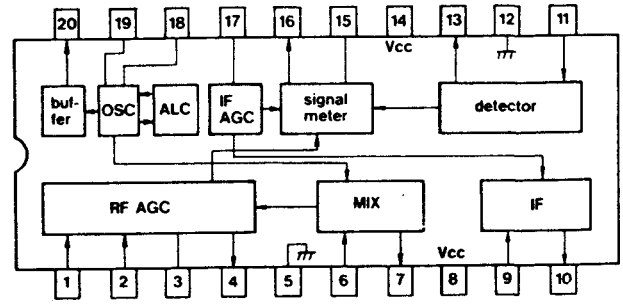
Performance

- MIX
- OSC (with ALC)
- IF amplification
- Detection
- AGC (Normal)
- RF wide bandwidth AGC
- Stop signal for auto search (Signal meter output)
- LO OSC buffer Output

Maximum Ratings

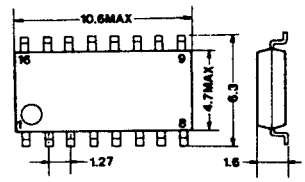
Item	Symbol	Condition	Rating	Unit
Supply voltage	Vcc max	Pin No. 8, 14	16	V
Output voltage	V_o	Pin No. 7, 10	24	V
Input voltage	V_i	Pin No. 6	5.6	V
Power dissipation	Vd max	Ta ≤ 50°C	730	mV

Block Diagram



■TD62305F 051-0829-04 Darlington Transistor Array

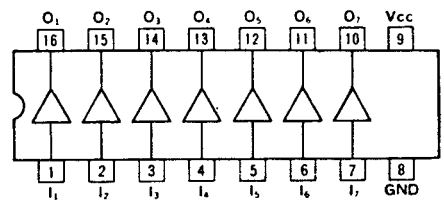
Outward Form



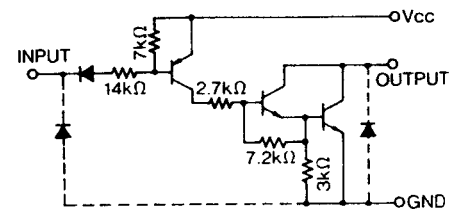
Absolute Maximum Ratings

Item	Symbol	Rating	Unit
Power voltage	Vcc	7.0	V
C-E Sustaining voltage	V	35	V
Output current	I_{OUT}	350	mA
Input voltage	V_{IN}	7.0	V
Input current	I_{IN}	−10	mA
GND terminal current	I_{GND}	2.3	A
Power dissipation	P_D	0.625	W

Block Diagram

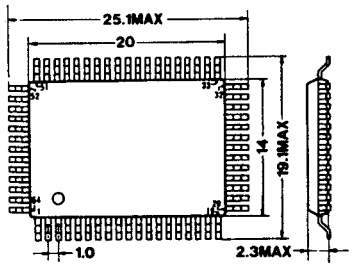


Circuit Diagram



■μPD1714G-635-12 051-0876-10 Micro Computer

I. Outward Form



II. Outline

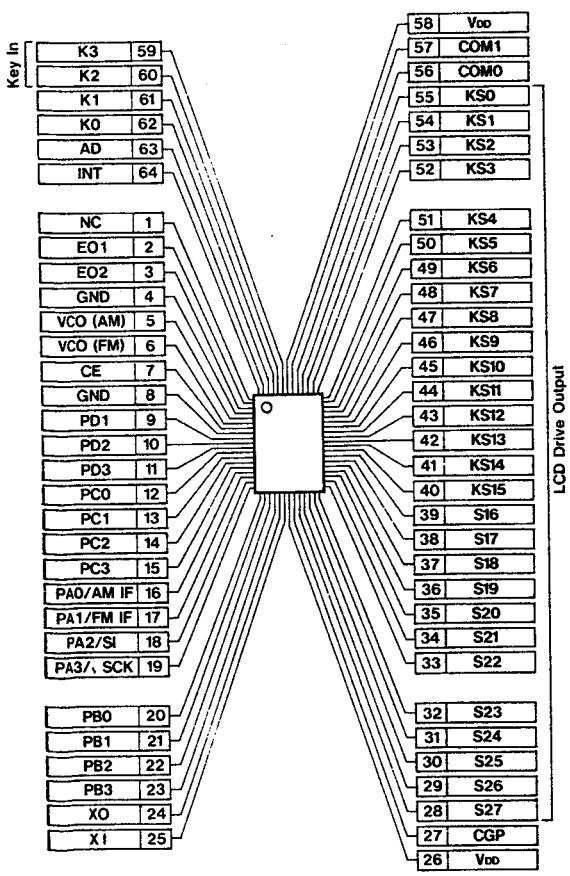
This IC, which can receive FM and MW is a complete 1-chip controller incorporating a prescaler, PLL frequency synthesizer and LCD driver.

(1) Prescaler incorporate.
(2) PLL frequency synthesizer incorporated.
(3) 3 bands with FM1/FM2/MW.
(4) UP/DOWN channel selectable by AUTO/MANUAL.
(5) Preset and memory available for FM1/FM2/MW.

III. Receive Bands

		Receive Frequency	Channel Space	Comparative Frequency	Intermediate Frequency
U.S.A	MW	530~1,620kHz	10kHz	10kHz	450kHz
	FM	87.9~107.9MHz	200kHz	25kHz	10.7MHz
Australia	MW	531~1,602kHz	9kHz	9kHz	450kHz
	FM	87.9~107.9MHz	100kHz	25kHz	10.7MHz
Japan	MW	522~1,629kHz	9kHz	9kHz	450kHz
	FM	76.0~90.0MHz	100kHz	25kHz	−10.7MHz

IV. Terminal Connection



Pin 26 and 58 is Internally connected.

V. Terminal Description

Pin No.	Symbol	I/O	Function
1	NC	–	Not in use.
2 3	EO 1 EO 2	O	PLL error output terminals. When devided VCO output is higher than a reference frequency, "H" is output from these terminals, and when it is lower, "L" is output. When they coincide with each other, floating occurs. Use either EO1 or EO2 because same wave form is output from them.
4 8	GND	–	Ground.
5	VCO (AM)	I	Inputs VCO output of 0.6 to 15MHz (0.3 Vp-p MIN.).
6	VCO (FM)	I	Inputs VCO output of 15 to 150MHz (0.5 Vp-p MIN.).
7	CE	I	Select signal input terminal of a device. Set to "H" when you make the device function normally, and set to "L" when you do not use it.
9	DOLBY M4	O	Tape mode Dolby control output. Active="High" Radio mode M4 channel indicator control output. Active="High"
10	M2	O	M2 channel indicator control output. Active="High"
11	APC M3	O	Tape mode APC control output. Active="High" Radio mode M3 channel indicator control output. Active="High"
12	T/R	I	Cassette pack-in detect input terminal. Pulls up through a transistor switch. Judges "L" as cassette pack-in.
13	RST	I	Becomes RESET at "H".
14	ST	I	ST station detect input terminal. Pulls up by being connected to the ST IND terminal. Judges "L" as the ST station. Displays by LCD only when executing in the ST ON mode.
15	SD	I	With input of high level to this terminal, it is judged that the broadcasting station could receiver.
16	CD. IN	I	The control input terminal from external devices. At High input, it operates normally and at Low input, the radio and the tape functions are stopped. This disables the Keys and the output signals related to radio or tape. High is output to R/T port only.
17	M1	O	M1 indicator output. Active="High"
18	T/R OUT	O	The output will be reversed at cassette pack in/out At TAPE or if High is input to CD IN port, High will be output. It will be switched after 50m Sec of MUTE ON. This output is maintained at CE OFF.
19	F/R	I	Tape run direction detect input terminal. Valid when the pin 12(T/R) is "L". "L" in the FOW mode, and "H" in the REV mode.
20	MUTE	O	Output terminal to eliminate a shock noise when the PLL unit is unlocked. Active "L".
21	LOUD	O	LOUDNESS ON/OFF selector output terminal. "H" in the LOUDNESS ON mode, and "L" in the LOUDNESS OFF mode. Corresponding to the LOUDNESS ON/OFF key, LOUDNESS is turned off("L") when V_{DD} is turned on. (See Momentary Sw. No. (7))
22	DNR M6	O	Tape mode DNR control output. Active="High". Radio mode M6 indicator output.
24 25	XO XI	I	This is a connection terminal for a crystal oscillator. Connect a 4.5MHz crystal to it. Adjust the oscillation frequency while observing the XO terminal.
26 58	V_{DD}	–	This is the power supply terminal of the device. When the device operates, a voltage of 5V±10% will be supplied.
28	DX/LO	O	Auto DX/LOCAL terminal in auto tuning such as SEEK, AUTO STORE, and so on. Valid in all bands of FM, and MW. "H" in the LOCAL mode, and "L" in the DX (normal reception) mode.

Pin No	Symbol	I/O	Function
29	AM BW	O	AM Band width control output The output will be reversed each time a key is pressed at AM with active High
30	BAND	O	Control output terminal for switching power supply of FM/MW FM time High level MW Low level
31	NR M5	O	The noise reduction control output terminal At the tape mode that depends on the initial setting A and B and the output is made in combination with the ▯▯ terminal (9) and the DNR terminal (22) (I) A=0 B=1 or A=1 B=0 Only the DNR terminal have the output with active High while the ▯▯ and the NR terminals are always kept at Low level
32 \ 55	S23 \ S0	O	Terminal which outputs segment signal to the LCD panel and key matrix signal
56 57	COM0 COM1	O	Common signal output terminal to the LCD panel
59 \ 62	K3 \ K0	I	Key matrix signal input terminal (See Key Matrix)
64	INT	I	Not in use

	DNR ON	NR ON
DNR	1	0
NR	0	1

(III) A=B=0

	ON	NR ON	DNR ON
	1	0	0
NR	0	1	0
DNR	0	0	1

1 : High 0 : Low

At the radio mode when the diode SW of PS IND is on the signal is active High at the indicator output terminal for M5

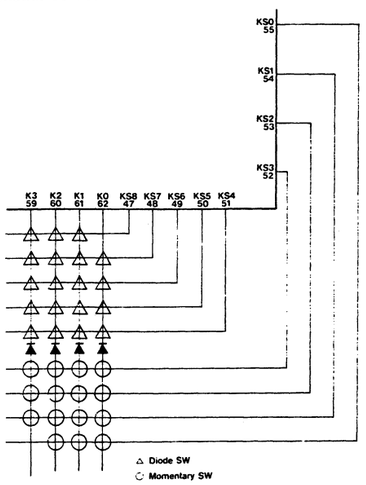
VI

1 Key Matrix Connection Table

	K3 (59)	K2 (60)	K1 (61)	K0 (62)
KS0 (55)	——	M3	M2	M1
KS1 (54)	LOUD	M6	M5	M4
KS2 (53)	M DWN	T M/M UP	DWN	UP
KS3 (52)	AS	PS	BAND	AM BW
KS5 (50)	T MODE 1	T MODE 2		
KS7 (48)	A	B	FMST/AMST	
KS8 (47)	AREA 0	AREA 1		PS IND

▭ : Momentary SW ▭ : Diode SW

2 Key Matrix Connection and Switch Form



3 Diode SW

The initial setting diode matrix will be read when the power is applied at the beginning (V_{DD} : Low → High) and when the CE terminal changes from the low the high level In the Table below 0 means the diode switch is OFF (Open) and 1 does the diode switch is ON (Short)

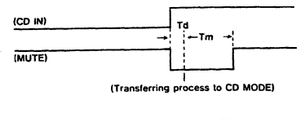
Symbol	Function
AREA 0 AREA 1	Use this switch when setting the destination
FMST/AMST	This switch is to select whether the ST display is effective only at FM or at FM+AM 0 : Effective at FM+AM 1 : Effective at FM only
T MODE	Select scan mode

AREA 0	AREA 1	Area
0	0	U S A
0	1	Japan
1	0	Australia

T MODE 1	T MODE 2	KEY	Function
0	0	M DOWN	Manual down
		T M/M UP DOWN	T M Seek down scan down or manual down
		UP	Seek UP Scan UP or Manual UP
0	1	M DOWN T M /M UP DWN UP	Manual down Manual up Seek down Seek up
1	0	M DOWN T M /M UP DWN UP	Manual down Manual up Scan down Scan up
1	1	M DOWN T M /M UP DWN UP UP	Manual down T M Seek down or manual down Seek UP or Manual UP

4 Momentary SW

NO	SW name	Function
1	M UP M DWN	Channel UP/DOWN key Every time this key is pressed a frequency is increased (M UP) or decreased (M DOWN) by 1 step If this key is kept pressed for 0 5 second or more fast forwarding will be performed at the following intervals until the key is released FM mode : About 20mS MW mode : About 70mS If the M UP key is pressed at an upper limit frequency the frequency will jump to a lower limit one and if the M DOWN key is pressed at the lower limit frequency the frequency will jump to the upper limit one
2	M1 ~ M6	Preset memory write/call key FM1 FM2 and MW can be independently memorized for one key There are 18 stations in total; 6 channels for FM1 6 for FM2 6 and MW Valid only in the RADIO mode (1) When calling For example if the M1 key is pressed and it is released within 2 seconds with the FM band selected a frequency memorized there will be called upon its release When the key is pressed during auto tuning the frequency is called upon pressing because a write action is disabled (2) When writind For example if the M3 key is kept pressed for 2 seconds or more with the MW band selected a frequency being displayed will be written to M3 The SEEK mode and TAPE mode disable a write action
3	SEEK UP SEEK DOWN	If SEEK UP/DOWN KEY is pressed, auto tuning is performe by increasing or decreasing one channel When SD signal High is input during auto tuning the frequency at that time will be maintained SD signal is tested after setting the waiting time to approx 20mS for FM and approx 40mS for AM preceded by PLL lock If High is input at this time auto tuning will be released At the band edge just as the manual tuning it becomes upper limit ↔ lower limit and SD is detected after waiting the frequency changed for 250mS In auto tuning searching is performed by a DX mode If the same key is pressed again searching stops at the present frequency More over if the key for the opposite direction is pressed the direction will be changed while searching is continued If the power is turned off and the function becomes a tape mode during auto tuning the rewriting of the last channel will not be performed and the frequency with which the auto tuning is started is held in the last channel memory Therefore when the power is turned on or it becomes a radio mode next time the frequency with which the previous auto tuning is started will be regained

NO	SW name	Function
4	SCAN UP SCAN DOWN	If SCAN UP/DOWN KEY is pressed auto tuning will be started and if High is input to the SD Signal input during auto tuning the present station is held at the frequency for five seconds and the unit becomes the receiving state Then after five seconds auto tuning will be resumed There after SCAN operation is repeated SCAN operation will be released if either UP or Down key (A Key presently in effect) is pressed during auto tuning or during half for five seconds Then the unit becomes the receiving state at the frequency
5	AS	AUTO STORE Key If pressed for 2 seconds or more it starts seeking in the UP direction from the frequency currently received and sequentially stores channels (from CH1 to CH6) where SD exists and an IF frequency matches Storing the channels in the LOCAL mode for the 1st time and in the DX mode for the 2nd time CH1 is called after having stored up to CH6 or having made two rounds of them
6	BAND	Use this switch when switching the band Each time the key is pushed switching will be make as FM MW and so on and will receive the last channel memory of a newly switched band Also Low at time of AM or High at time of FM will be output from the controlled signal output terminal for switching FM and MW FM1 → FM2 → MW ┐ (U S A Type) ↑ ┘ FM → MW ┐ (Japan Australia Type) ↑ ┘
7	PS	PRESET SCAN Key Starting at the channel next to the one currently receiving a frequency if the channel has SD and the IF frequency matches it receives for 5 seconds and proceeds to the next channel During P/S operation if the CH Key is pressed or the P/S Key is pressed again P/S operation is terminated
8	CD IN	When High is input to CD IN terminal the mute signal will be output as follows  Td : First out mute Approx 50mS Tm : Last out mute Approx 50mS
9	LOUD	This key is a switch which controls the loudness function Each time this key is pressed ON and OFF alternate When the key is ON, High is output from the output port at the same time as display This key is acceptable in both the radio and tape (CD) mode
10	DNR	This key is a switch which controls the DNR function Each time this key is pressed ON and OFF alternate When the key is ON High is output from the output port at the same time as display This key is acceptable in both the radio and tape mode
11	APC	Each time this key is pressed ON and OFF alternate When the key is ON High is output from the output port at the same time as display
12	▯▯ DNR NR	This Key is valid in the tape mode Each time this Key is pressed ON and OFF alternate When the Key is ON the output is made is combination with the ▯▯ terminal (9) The VR terminal (31) and the DNR terminal at the same time as display These Keys function as each alternating reset type (With preference of latter input) The initial setting is OFF

■PARTS LIST:

◎Electrical section

◎MAIN P W B

NOTE : OM (Oxidized Metal) SS (Super Small)
S (Small) TC (Temperature Compensating)
HD (Higher Dielectric) LL (Low Leak)
SC (Semi Conductor) USS (Ultra Super Small)

REF NO	PART NO	DESCRIPTION	Q TY
D202	001 0195 00	Diode AW01	1
2~4 101~103 203~210 212 213,502 504~506 510~512 D515~523 537~539 600 603~608 611 612 615 618 621 626 627,630,631	001 0330 00	Diode 1SS119	51
D1	001 0366 90	Diode LTZ MR15T	1
D620	001 0377 14	Diode MA4033M	1
D619	001 0377 32	Diode MA4056M	1
D624	001 0377 35	Diode MA4062M	1
D628	001 0377 41	Diode MA4075M	1
507~509 D524~528 601 629	001 0391 00	Diode DCE015 AC	10
D614	001 0423 14	Diode MA4036	1
D503	001 0423 15	Diode MA4039	1
D536 633	001 0423 18	Diode MA4051	2
D501 623	001 0423 19	Diode MA4056	2
D613	001 0423 21	Diode MA4068	1
D609 622	001 0423 23	Diode MA4082	2
D201 616 617	001 0423 24	Diode MA4091	3
D538 634	001 0454 00	Diode MA700	2
D514 535	001 0464 00	Diode 1GWJ42	2
IFT1	005 0836 00	IF transformer	1
IFT2	005 0976 00	IF transformer	1
L101	010 2003 03	Coil	1
L102	010 2046 32	Coil	1
VR1 2	012 3808 06	Variable resistor 10kΩ	2
VR3	012 4318 06	Variable resistor 10kΩ	1
CCT501	050 0077 02	Component circuit 10kΩx4	1
CCT502	050 0086 00	Component circuit 10kΩx8	1
IC501 504	051 0390 05	IC TD62104F	2
IC502	051 0740 01	IC TMP42C70N	1
IC1	051 0798 20	IC TA7411AP	1
IC503	051 0829 04	IC TD62305F	1
IC504	051 0876 10	IC μPD1714G635 12	1
X101	060 0067 52	Ceramic resonator	1
SUP1	060 0122 00	Surge protector	1
X201	060 0129 00	Buzzer	1
X301	061 1053 00	Crystal	1
Q502	100 1015 00	Transistor 2SA1015OYGR	1
Q601 617	100 1048 00	Transistor 2SA1048OYGR	2
Q500 620	100 1315 00	Transistor 2SA1315OY	2
Q504~507	100 1346 00	Transistor 2SA1346AC	4
1,2,101 102 205 C510~513 Q515 602 604 608 609 616 618 619 621	102 2458 00	Transistor 2SC2458	18
202~204 503 508,509 Q516~518 603 605 622 623	102 3400 00	Transistor 2SC3400AC	13
Q610	103 0947 00	Transistor 2SD947	1
201 501 600 Q606 607 612 615	103 1225 00	Transistor 2SD1225MPQR	7
Q613 614	103 1504 00	Transistor 2SD1504	2
Q514	108 0369 00	FET 2SK369	1
R202	114 1011 11	Film resistor 1Ws100Ω OM	1
R614	114 3391 21	Film resistor 2Ws3 3Ω OM	1
C509	042 0348 00	Electrolytic capacitor 16V2200μF	1
C6	043 0039 92	Ceramic capacitor 16V0.1μF	1
C15	160 1822 05	Ceramic capacitor 1800pF B HD	1
C14	160 3912 05	Ceramic capacitor 390pF B HD	1
C3~5 8 13	171 1033 06	Ceramic capacitor 0.01μF SR SC	5
C16 17	171 1533 06	Ceramic capacitor 0.015μF SR SC	2
C103	171 2233 06	Ceramic capacitor 0.022μF SR SC	1
C18 19	171 3323 06	Ceramic capacitor 0.0033μF SR SC	2
C520	171 3333 06	Ceramic capacitor 0.033μF SR SC	1
C108 109 611	171 3932 06	Ceramic capacitor 0.0039μF SR SC	3
C102 104 110 111	171 4733 06	Ceramic capacitor 0.047μF SR SC	4
C12	174 1000 13	Ceramic capacitor 10pF CH TC	1
C504 505	174 1010 13	Ceramic capacitor 100pF CH TC	2
C101 507 508	174 2200 13	Ceramic capacitor 22pF CH TC	3
C106	179 2273 23	Electrolytic capacitor 10V220μF S	1
C604 607	179 3373 33	Electrolytic capacitor 16V330μF S	2
C7 9 105	183 1053 62	Electrolytic capacitor 50V1μF USS	3
C10,201 502 603	183 1063 32	Electrolytic capacitor 16V10μF USS	4
C11 506	183 2253 62	Electrolytic capacitor 50V2.2μF USS	2
C503	183 2263 32	Electrolytic capacitor 16V22μF USS	1
C1 2	183 3343 62	Electrolytic capacitor 50V0.33μF USS	2
C609	183 3353 62	Electrolytic capacitor 50V3.3μF USS	1
C205	183 4743 62	Electrolytic capacitor 50V0.47μF USS	1
C601 602 608 610	183 4763 32	Electrolytic capacitor 16V47μF USS	4
C202~204 501,605,606	183 6863 22	Electrolytic capacitor 10V68μF USS	6

◎VOLUME P W B

REF NO	PART NO	DESCRIPTION	Q TY
D211 400	001 0330 00	Diode 1SS119	2
D401 402	001 0423 19	Diode MA4056	2
D403	001 0423 23	Diode MA4082	1
VR401 402	012 4447 00	Variable resistor	2
VR408	012 4663-00	Variable resistor	1
CCT401	050 0104 00	Component circuit	1
IC403	051 0350 55	IC NJM4558M	1
IC402	051 0485 00	IC LM1894N	1
IC404 405	051 0556 01	IC NJM2058M	2
Q403	103 1225 00	Transistor 2SD1225MPQR	1

REF NO	PART NO	DESCRIPTION	Q TY
Q401 402	103 1504 00	Transistor 2SD1504 D E	2
C435 436	043 0208 00	Ceramic capacitor 16V0.15μF	2
C430	160 1022 05	Ceramic capacitor 1000pF B HD	1
C425	171 3333 06	Ceramic capacitor 0.033μF SR SC	1
C431 432	171 4723 06	Ceramic capacitor 0.0047μF SR SC	2
C426	171 4733 06	Ceramic capacitor 0.047μF SR SC	1
C447	182 1073 12	Electrolytic capacitor 6.3V100μF SS	1

REF NO	PART NO	DESCRIPTION	Q TY
C429	183 1053 62	Electrolytic capacitor 50V1μF USS	1
C439 440 452 454	183 1063 32	Electrolytic capacitor 16V10μF USS	4
C433 434 442 453,456	183 2253 62	Electrolytic capacitor 50V2.2μF USS	5
437 438 443 C444 448~451	183 4753 52	Electrolytic capacitor 35V4 7μF USS	8
C428	183 4763 32	Electrolytic capacitor 16V47μF USS	1
C427 441 445 C446	183 6863 22	Electrolytic capacitor 10V68μF USS	4

◎DOLBY P W B

REF NO	PART NO	DESCRIPTION	Q TY
D301 302	001 0330 00	Diode 1SS119	2
VR301 302	012 3939 05	Variable resistor 10kΩ	2
IC302	051 0561 01	IC AN6263N	1
IC301	051 0714 00	IC TA7705P	1
IC401	051 0830 00	IC CXA1097Q	1
L401 402	060 0124 00	Low Pass Filter	2
Q301 302	102 2458 00	Transistor 2SC2458	2
R307 313	116 1231 10	Chip resistor 1/8Ws12kΩ	2
R310 315	116 1531 10	Chip resistor 1/8Ws15kΩ	2
R305 311	116 1811 10	Chip resistor 1/8Ws180Ω	2
R308 312	116 1831 10	Chip resistor 1/8Ws18kΩ	2
R309 316	116 2221 10	Chip resistor 1/8Ws2 2kΩ	2
R301~304	116 2231 10	Chip resistor 1/8Ws22kΩ	4
R306 314	116 3341 10	Chip resistor 1/8Ws330kΩ	2
C409 420	172 4732 20	Polyester capacitor 0.047μF SS	2
C311 408 419	172 6831 20	Polyester capacitor 0.068μF SS	3

REF NO	PART NO	DESCRIPTION	Q TY
C411 422	173 1032 10	Polyester capacitor 0.01μF S	2
C406 417	173 1531 10	Polyester capacitor 0.015μF S	2
C403 414	173 4721 10	Polyester capacitor 4700pF S	2
C410 421	173 6821 10	Polyester capacitor 6800pF S	2
C310	177 2232 05	Ceramic chip capacitor 0.022μF HD	1
C301~304	177 6812 05	Ceramic chip capacitor 680pF HD	4
C402 413	179 2273 23	Electrolytic capacitor 10V220μF S	2
C309	182 1063 32	Electrolytic capacitor 16V10μF SS	1
C307	182 3363 03	Electrolytic capacitor 4V33μF SS	1
C305	182 3363 12	Electrolytic capacitor 6.3V33μF SS	1
C423 424	183 1063 32	Electrolytic capacitor 16V10μF USS	2
C405 416	183 1543 62	Electrolytic capacitor 50V0.15μF USS	2
C407 418	183 2243 62	Electrolytic capacitor 50V0.22μF USS	2
C401 412	183 2253 62	Electrolytic capacitor 50V2.2μF USS	2
C404 415	183 4743 62	Electrolytic capacitor 50V0.47μF USS	2

◎AM-ST TUNER 880-1507B

REF NO	PART NO (ORDER NO)	DESCRIPTION	Q TY
D_{1-3}	001 0402 00	Diode (1SV149AB)	3
D_4	001 0453 00	Diode (1SS237)	1
TH_1	002 0204 00	Thermistor (350Ω TD)	1
$TC_{1\,2\,3}$	004 1567 00	Trimmer (20pF)	3
IFT_1	005 0951 01	IF transformer (IFT 1)	1
IFT_2	005 0961 01	IF transformer (IFT 2)	1
IFT_4	005 0962 00	IF transformer (10A)	1
IFT_3	005 0963 01	IF transformer (BFU 450)	1
T_2	005 0973 00	IF transformer (T 2 2ND)	1
T_1	010 2112 00	Coil (T 1 1ST)	1
L_1	010 2113 00	Coil (L 1 5μH)	1
T_3	010 2114 00	Coil (T 3 OSC)	1
VR_1	012 3808 07	Variable resistor (22kΩ)	1
IC_2	051 0630 01	IC (MC13020P)	1
IC_1	051 0634-01	IC (LA1135)	1
CF_1	060 0112 00	Ceramic resonator (CSA3 6M17)	1
$Q_{1\,3\,4}$	102 2458 25	Transistor (2SC2458Y)	3
$Q_{5\,9}$	102 2670 15	Transistor (2SC2670O)	2
$Q_{6\,7}$	102 2715 15	Transistor (2SC2715 O)	2
Q_2	108 0435 51	FET (2SK435 CD)	1
Q_8	108 0494 50	FET (2SK494B)	1
R_{28}	117 1021 10	Chip resistor (1/8W1kΩ) S	1
$R_{14\,15\,18\,20}$	117 1031 10	Chip resistor (1/8W10kΩ) S	4

REF NO	PART NO (ORDER NO)	DESCRIPTION	Q TY
R_{36}	117 1041 10	Chip resistor (1/8W100kΩ) S	1
R_{11}	117 1211 10	Chip resistor (1/8W120Ω) S	1
$R_{29\,31}$	117 1521 10	Chip resistor (1/8W1 5kΩ) S	2
R_{13}	117 2201 10	Chip resistor (1/8W22Ω) S	1
R_{22}	117 2211 10	Chip resistor (1/8W220Ω) S	1
R_{39}	117 2221 10	Chip resistor (1/8W2.2kΩ) S	1
R_{34}	117 2741 10	Chip resistor (1/8W270kΩ) S	1
R_6	117 2711 10	Chip resistor (1/8W270Ω) S	1
R_{12}	117 3311 10	Chip resistor (1/8W330Ω) S	1
$R_{16\,37}$	117 3321 10	Chip resistor (1/8W3 3kΩ) S	2
R_{32}	117 3921 10	Chip resistor (1/8W3 9kΩ) S	1
R_{30}	117 4311 10	Chip resistor (1/8W430Ω) S	1
R_3	117 4701 10	Chip resistor (1/8W47Ω) S	1
$R_{27\,38}$	117 4711 10	Chip resistor (1/8W470Ω) S	2
R_{17}	117 4721 10	Chip resistor (1/8W4 7kΩ) S	1
R_{35}	117 5631 10	Chip resistor (1/8W56kΩ) S	1
R_{25}	117 6821 10	Chip resistor (1/8W6 8kΩ) S	1
R_9	117 7501 10	Chip resistor (1/8W75Ω) S	1
R_{21}	117 8201 10	Chip resistor (1/8W82Ω) S	1
R_{33}	117 8211 10	Chip resistor (1/8W820Ω) S	1
C_{37}	043 0204 00	Ceramic capacitor (50p)	1
C_2	171 1533 06	Ceramic capacitor (0.015μF) SC	1
C_{43}	173 3322 10	Ceramic capacitor (0.0033μF) S	1

REF NO	PART NO (ORDER NO)	DESCRIPTION	Q TY
C_{12}	174 1000 13	Ceramic capacitor (10pF CH) TC	1
C_{13}	176 4311 00	Ceramic chip capacitor (430pF CH) TC,S	1
C_{11}	177 4732 05	Ceramic chip capacitor (0 047μF) HD	1
$C_{5\ 30}$	178 1022 05	Ceramic chip capacitor (1000pF) HD,S	2
$C_{17\ 22\ 26\ 38}$	178 1032 05	Ceramic chip capacitor (0 01μF) HD,S	4
C_3	178 1045 06	Ceramic chip capacitor (0 1μF) HD,S	1
$C_{1,8,9,10,14\ 21\ 23\ 27\ 29}$	178 2232 05	Ceramic chip capacitor (0.022μF) HD,S	9
$C_{40\ 41\ 42}$	178 3322 05	Ceramic chip capacitor (0 0033μF) HD,S	3
C_6	178 4735 06	Ceramic chip capacitor (0 047μF) HD,S	1
C_{25}	042 0199 00	Electrolytic capacitor (10V22μF TAN)	1

REF NO	PART NO (ORDER NO)	DESCRIPTION	Q TY
$C_{20\ 39}$	042 0200 00	Electrolytic capacitor (10V47μF TAN)	2
$C_{35\ 36}$	042 0391 00	Electrolytic capacitor (35V0 47μF TAN)	2
C_{16}	042 0239 00	Electrolytic capacitor (16V1μF TAN)	1
C_{15}	042 0227 00	Electrolytic capacitor (16V2 2μF TAN)	1
$C_{19\ 28\ 34}$	182 1063 32	Electrolytic capacitor (16V10μF) SS	3
C_{24}	182 1073 22	Electrolytic capacitor (10V100μF) SS	1
$C_{31\ 33}$	182 2253 62	Electrolytic capacitor (50V2 2μF) SS	2
C_{18}	182 3353 62	Electrolytic capacitor (50V3.3μF) SS	1
C_4	182 4763-12	Electrolytic capacitor (6 3V47μF) SS	1
C_{32}	182 4753 52	Electrolytic capacitor (35V4 7μF) SS	1

◎FM TUNER 880-1407A

Ref No	Part No (Order No)	Description	Q ty
D1	001 0368 00	Diode (1SV121)	1
D3	001 0423 13	Diode (MA4033)	1
D2 4 5	001 0442 00	Diode (1SV147)	3
C1	004-1567 00	Trimer (20P)	1
IFT1	005 0966 00	IF Transfomer	1
IFT2 3	005 0967 00	IF Transfomer (MS3LK)	2
L4	010 1570 01	Coil (RF)	1
L1	010 2046 03	Coil (0 039μH)	1
L2	010 2046 14	Coil (3 3μH)	1
L6	010 2104 00	Coil (OSC)	1
L3 5	010 2105 00	Coil (L4 5T)	2
IC1	051 0730 00	IC (HA12438FP)	1
R14	117 1011 10	Chip resistor (1/16W 100Ω)	1
R6 11 13	117 1021 10	Chip resistor (1kΩ)	3
R12	117 1031 10	Chip resistor (10kΩ)	1
R3 7	117 1041-10	Chip resistor (100kΩ)	2
R5	117-2211 10	Chip resistor (220Ω)	1

Ref No	Part No (Order No)	Description	Q ty
R2 9 10	117 3331 10	Chip resistor (33kΩ)	3
R8	117 4701 10	Chip resistor (47Ω)	1
R4	117 6831 10	Chip resistor (68Ω)	1
Q3	124 0114 15	Transistor (3SK114)	1
Q1	125 0001 01	Transistor (UN2111)	1
Q2	125 0006 00	Transistor (UN2110)	1
C11	176 1007 00	Ceramic chip capacitor (10pF)	1
C3 6 18	176 1501 00	Ceramic chip capacitor (15pF)	3
C14 15 16	176 2201 00	Ceramic chip capacitor (22pF)	3
C4	176 5601 00	Ceramic chip capacitor (56pF)	1
C5 9 13	176 6097 00	Ceramic chip capacitor (6pF)	3
C2	176 8097 00	Ceramic chip capacitor (8pF)	1
C21	178 1022 05	eramic chip capacitor (0 001μF)	1
C1 7 8 10 17	178 1032 05	Ceramic chip capacitor (0 01μF)	5
C12 19	178 2232 05	Ceramic chip capacitor (0.022μF)	2
C20	183 1053 62	Electrolytic capacitor (50V 1μF)	1

◎MECHANISM P W B

REF NO	PART NO (ORDER NO)	DESCRIPTION	Q TY
$D_{601\sim604}$	001 0330 00	Diode (1SS119)	4
Q_{605}	100 1048 00	Transistor (2SA1048)	1
$Q_{601\ 602}$	100 1297 00	Transistor (2SA1297)	2

REF NO	PART NO (ORDER NO)	DESCRIPTION	Q TY
$Q_{603\ 604}$	102 3267 00	Transistor (2SC3267GR,BL)	2
R_{601}	114 2291 11	Film resistor (1W2 2Ω) OM	1
C_{601}	182 1073 32	Electrolytic capacitor (16V100μF) SS	1

◎NC/MPX BLOCK A s y 880-0304A

REF NO	PART NO	DESCRIPTION	Q TY
VR_1	012 3707 05	Variable resistor (VR10kΩ)	1
VR_2	012 3707 08	Variable resistor (VR100kΩ)	1
CCT_1	050 0099 50	Component circuit	1
IC_1	051 0407 00	IC (LA2110)	1
IC_2	051 0733 01	IC (LA3430)	1
X_1	060 0115 02	Ceramic resonator	1
Q_1	102 2458 49	Transistor (2SC2458 YGR)	1
$R_{2\ 12}$	117 1041 10	Chip resistor (1/16W100kΩ) S	2
$R_{8\ 9}$	117 2221 10	Chip resistor (1/16W2 2kΩ) S	2
R_{14}	117 2231 10	Chip resistor (1/16W22kΩ) S	1
R_6	117 3331 10	Chip resistor (1/16W33kΩ) S	1
R_{10}	117 3921 10	Chip resistor (1/16W3 9kΩ) S	1
R_1	117 4721 10	Chip resistor (1/16W4.7kΩ) S	1
$R_{4\ 11\ 13}$	117 5621 10	Chip resistor (1/16W5 6kΩ) S	3

REF NO	PART NO	DESCRIPTION	Q TY
R_5	117 6821 10	Chip resistor (1/16W6 8kΩ) S	1
R_3	117 8211 10	Chip resistor (1/16W820Ω) S	1
C_6	171 2223 06	Ceramic capacitor (0 0022μF) SC	1
C_{16}	171 3333 06	Ceramic capacitor (0 033μF) SC	1
C_7	171 4733 06	Ceramic capacitor (0 047μF) SC	1
$C_{2\ 3}$	178 1032 05	Ceramic chip capacitor (0 01μF) HD,S	2
C_{10}	178 2232 05	Ceramic chip capacitor (0 022μF) HD,S	1
C_9	178 4722 05	Ceramic chip capacitor (0 0047μF) HD,S	1
$C_{4\ 15}$	178 6822 05	Ceramic chip capacitor (0 0068μF) HD,S	2
$C_{11\ 12}$	182 1053 62	Electrolytic capacitor (50V1μF) SS	2
C_{14}	182 1063 32	Electrolytic capacitor (16V10μF) SS	1
C_{13}	182 2243 62	Electrolytic capacitor (50V0 22μF) SS	1
C_5	182 2263 32	Electrolytic capacitor (16V22μF) SS	1
C_{18}	182 4753 52	Electrolytic capacitor (35V4 7μF) SS	2

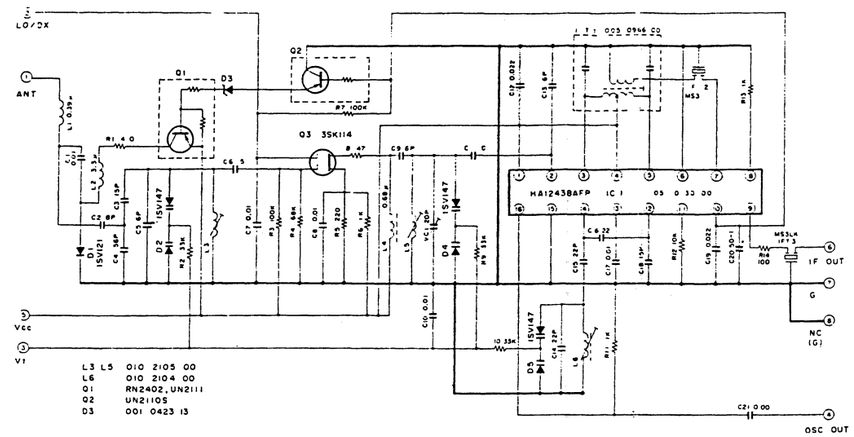
◎SW P W B

REF NO	PART NO	DESCRIPTION	Q TY
D513	001 0486 00	Diode LT1D1118 (RED)	1
$D_{529\sim534\ 540\sim543}$	001 0486 01	Diode LT1N1118 (GREEN)	10

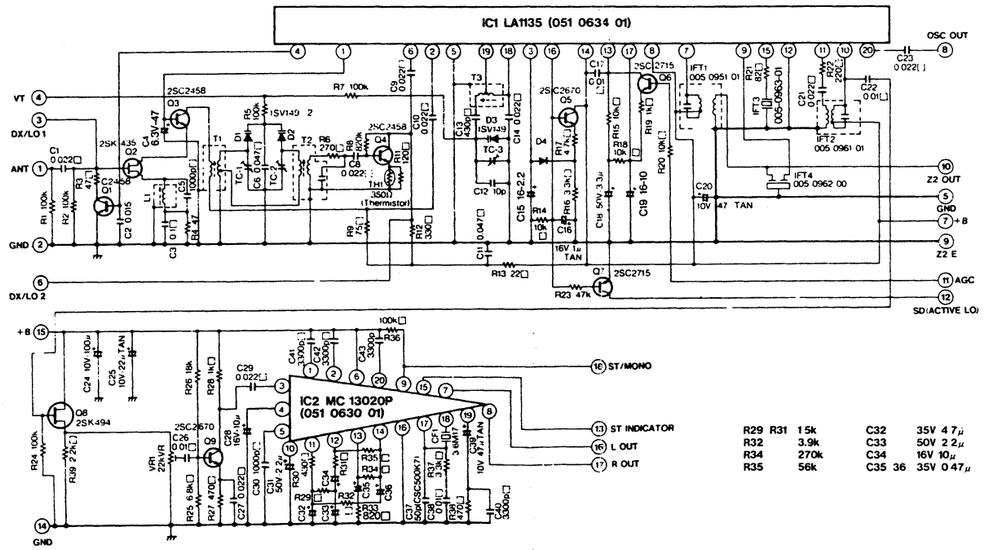
REF NO	PART NO	DESCRIPTION	Q TY
Q611	060 0150 00	Photo transistor	1

■BLOCK CIRCUIT DIAGRAM:

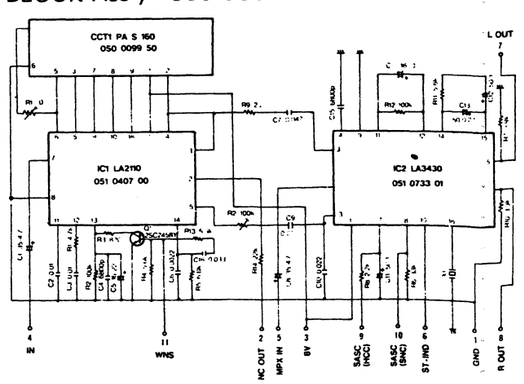
◎FM TUNER 880-1407A



◎AM-ST TUNER 880-1507B



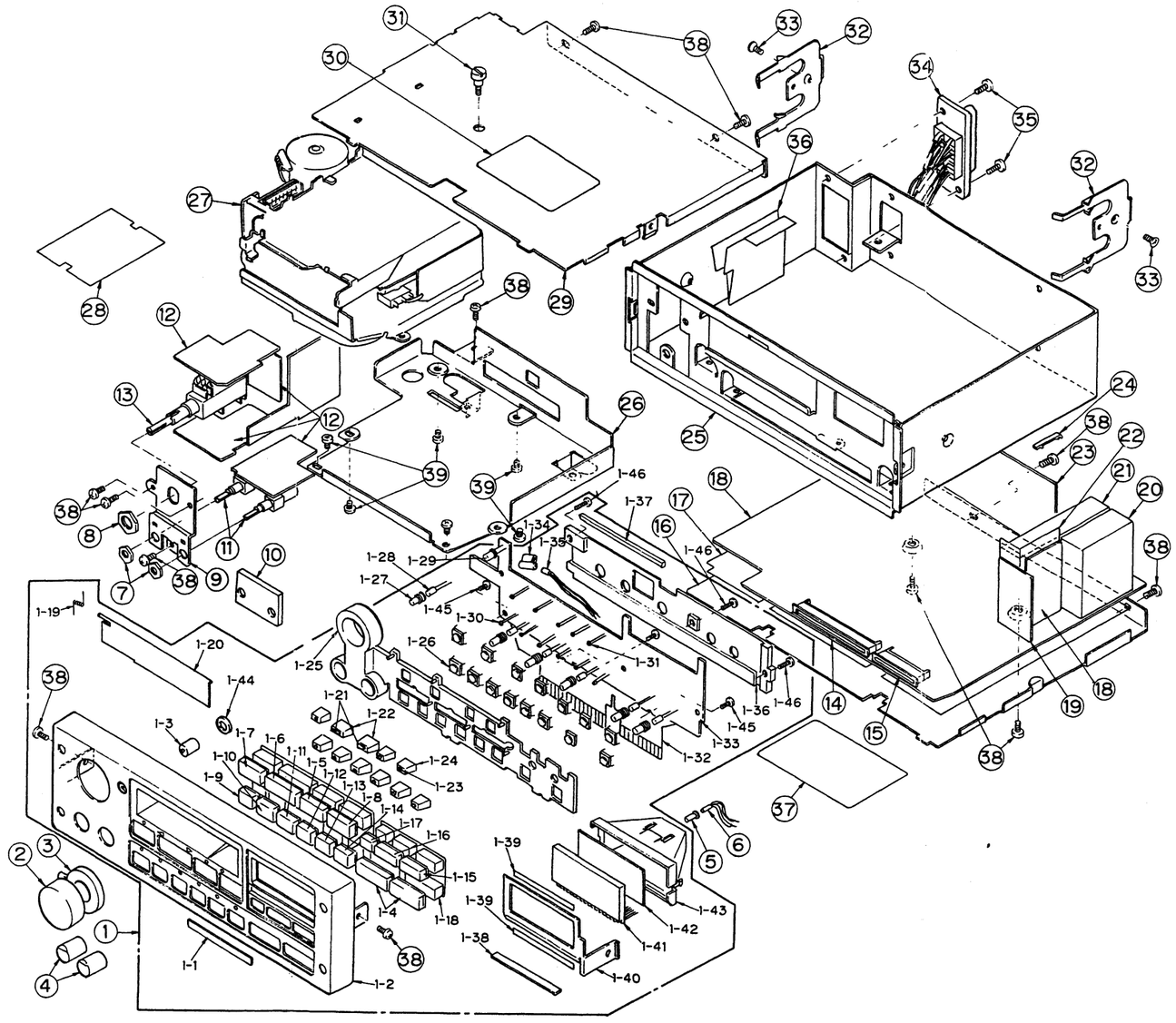
◎NC/MPX BLOCK Ass y 880-0304A



CLAR-00468 / Druck 3

■EXPLODED VIEW • PARTS LIST:

◎Main section



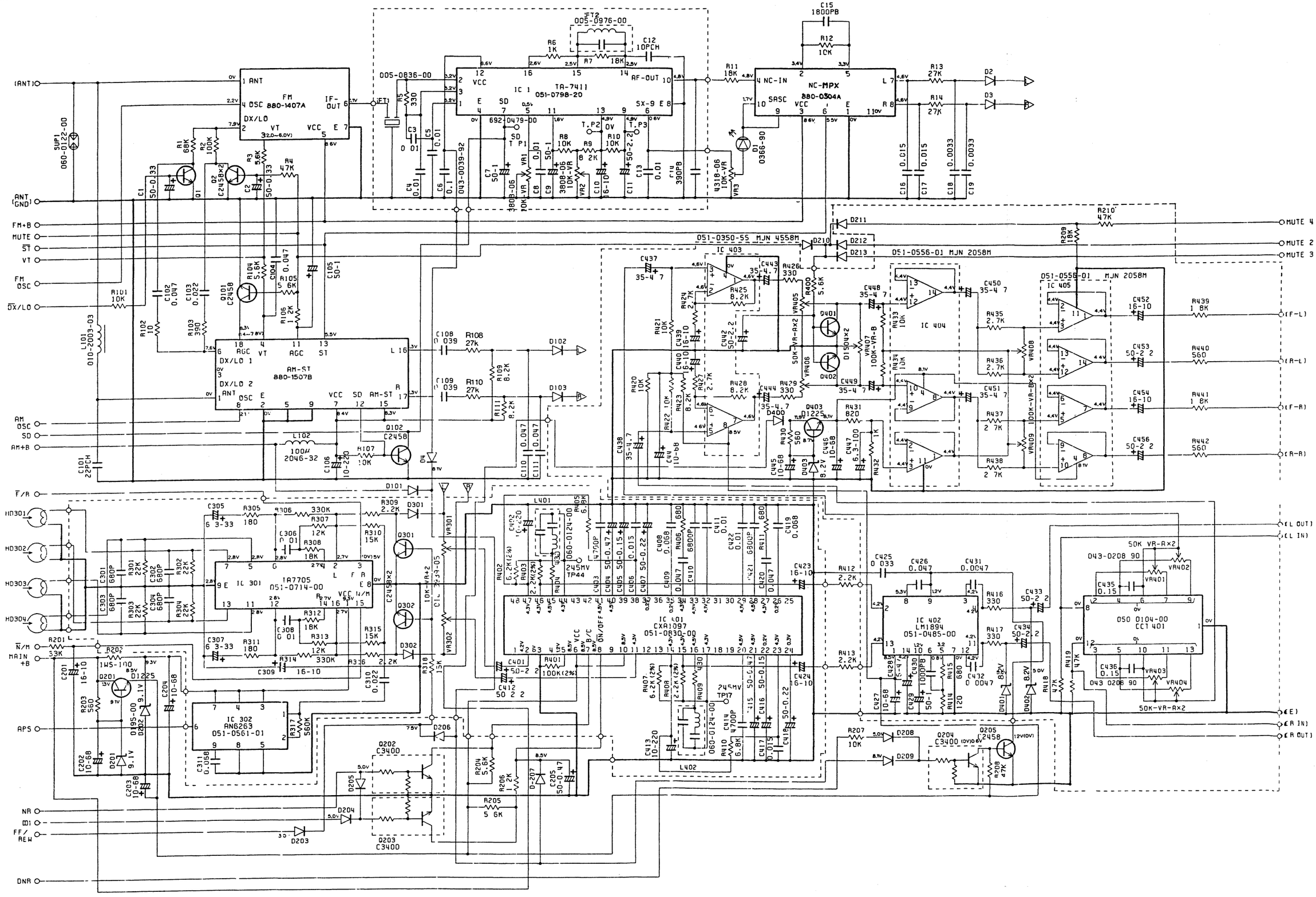
REF NO	PART NO	DESCRIPTION	Q TY
1	940 0866A	Escutcheon ass y	1
1 1	371 3451-00	Trim plate	1
1 2	370 4045 01	Escutcheon	1
1 3	335 2650 01	LED accessory	1
1 4	382 1409 00	Button (TUNING)	2
1 5	382 1410 00	Button (FF)	1
1 6	382 1411 00	Button (PRO)	1
1 7	382 1410 01	Button (REW)	1
1 8	382 1412 00	Button (EJECT)	1
1 9	382 1408 00	Button (1)	1
1 10	382 1408 01	Button (2)	1

REF NO	PART NO	DESCRIPTION	Q TY
1 11	382-1408 02	Button (3)	1
1 12	382 1408 03	Button (4)	1
1 13	382-1408 04	Button (5)	1
1 14	382-1408 05	Button (6)	1
1 15	382-1414 01	Button (BAND)	1
1 16	382-1414 00	Button (TUN MODE)	1
1 17	382 1413-00	Button (STORE)	1
1 18	345-4533 00	Cushion rubber	1
1 19	750-2309 01	Spring	1
1 20	320 0391 04	Dustproof cover	1
1 21	335 2592 00	LED accessory	2

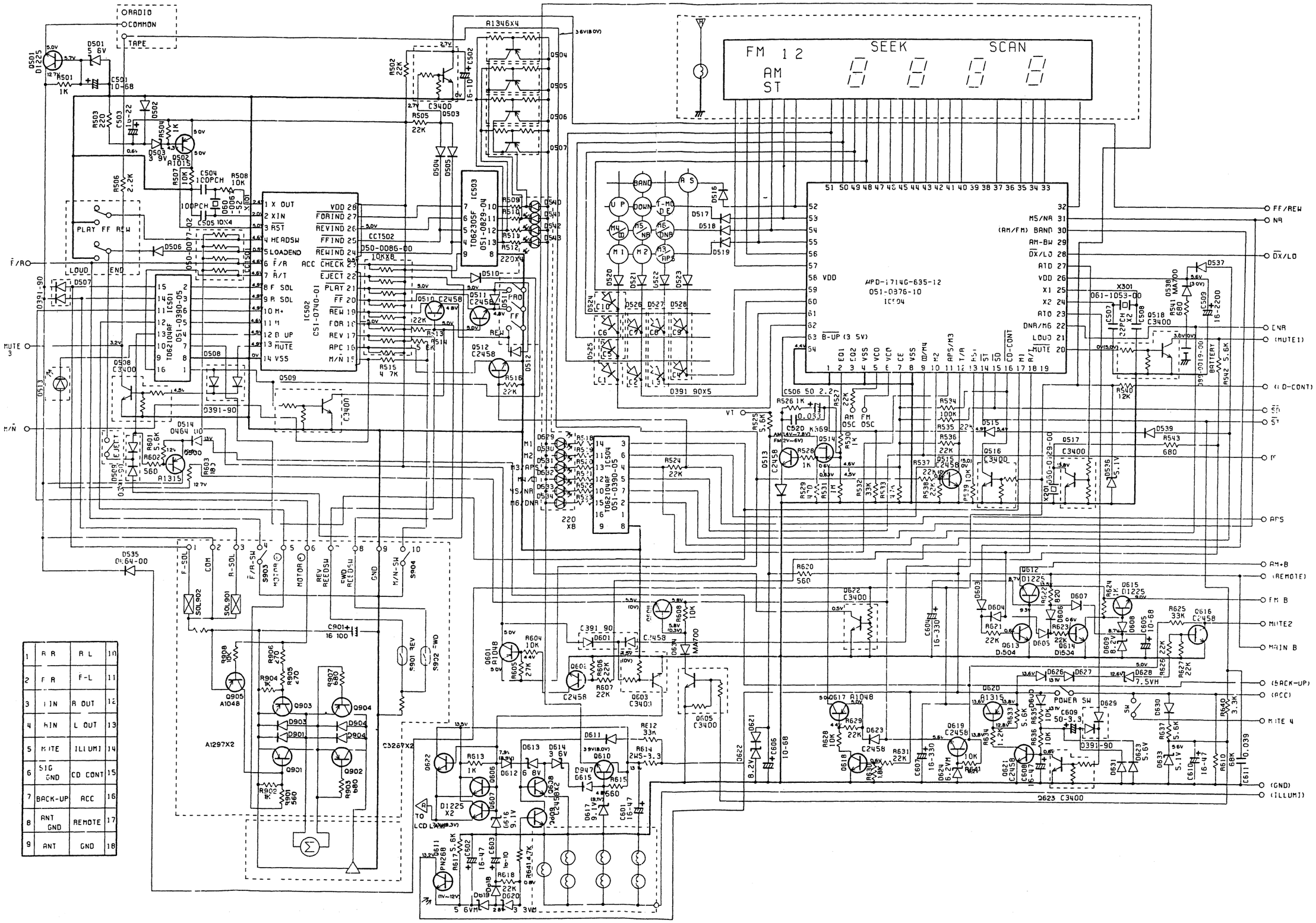
REF NO	PART NO	DESCRIPTION	Q TY
1 22	345 4532 00	Seal rubber	2
1-23	335 2591-00	LED accessory	9
1 24	345 4531-00	Seal rubber	9
1 25	335 2590 00	Illumi plate	1
1 26	013-3694 00	Switch	15
1 27	345 3814 10	Lamp holder	6
1 28	017 0338 06	Pilot lamp	6
1 29	060 0150 00	Transistor	1
1 30	001 0486 01	LED (Green)	10
1 31	001 0486 00	LED (Red)	1
1-32	099 8171 00	P W B (Flexible)	1

REF NO	PART NO	DESCRIPTION	Q TY
1 33	099 8170 00	P W B (SW)	1
1 34	345 3316 02	Lamp holder	1
1 35	017 0345 01	Pilot lamp	1
1 36	374 0901 00	Back plate	1
1 37	345 4625 00	Cushion rubber	1
1 38	347 2481 00	Insulator	1
1 39	347 0644 00	Insulator	2
1 40	330 8666 00	LCD cover	1
1-41	379 0183-00	LCD	1
1-42	335 2726 00	Color film	1
1 43	335 2589 00	LCD holder	1
1 44	345 4638 00	Seal rubber	1
1 45	716 0778 00	Wave screw (M2x6)	3
1 46	716 0779 00	Wave screw (M2x8)	3
2	380 4898 00	Knob (VR)	1
3	380 4295 00	Knob (FADER)	1
4	380 4899 00	Knob (BASS TREB)	2
5	345 4157 07	Lamp holder	1
6	017-0346 00	Pilot lamp	1
7	722-0332 00	Special nut	2
8	722 0231 00	Special nut	1
9	330-8658 00	VR holder	1
10	345 4630 00	Seal rubber	1
11	012-4447 00	Variable resistor (BASS TREB)	2
12	099 8168 00	P W B (VR)	1
13	012-4663 00	Variable resistor (SW VOL BAL FADER)	1
14	074 0731 36	Outlet socket	1
15	074 0731 18	Outlet socket	1
16	304 0397 00	Lower cover	1
17	347-2480 00	Insulator	1
18	099 8167 00	P W B (Main)	1
19	880-0304A	NC MPX Ass y	1
20	880 1407A	FM TUNER Ass y	1
21	880 1507B	AM TUNER Ass y	1
22	347 2479 01	Insulator	1
23	099 8169 00	P W B (Dolby)	1
24	335 2469 00	P W B holder	1
25	312 0288 01	Chassis	1
26	330 8657 00	Mechanism holder	1
27	930 0530 10	Tape mechanism	1
28	347 2477 00	Insulator	1
29	303 0348 00	Upper cover	1
30	285 1000 00	Guide label	1
31	716 0706 00	Lock screw	1
32	750 2649 00	Spring	2
33	714 3006 41	Machine screw (M3x6)	2
34	854 0058 01	Extension lead	1
35	714 3008 81	Machine screw (M3x8)	2
36	347 2478 00	Insulator	1
37	286 6922 00	Set plate	1
38	714 3006 81	Machine screw (M3x6)	12
39	714 3003 81	Machine screw (M3x3)	6

■CIRCUIT DIAGRAM

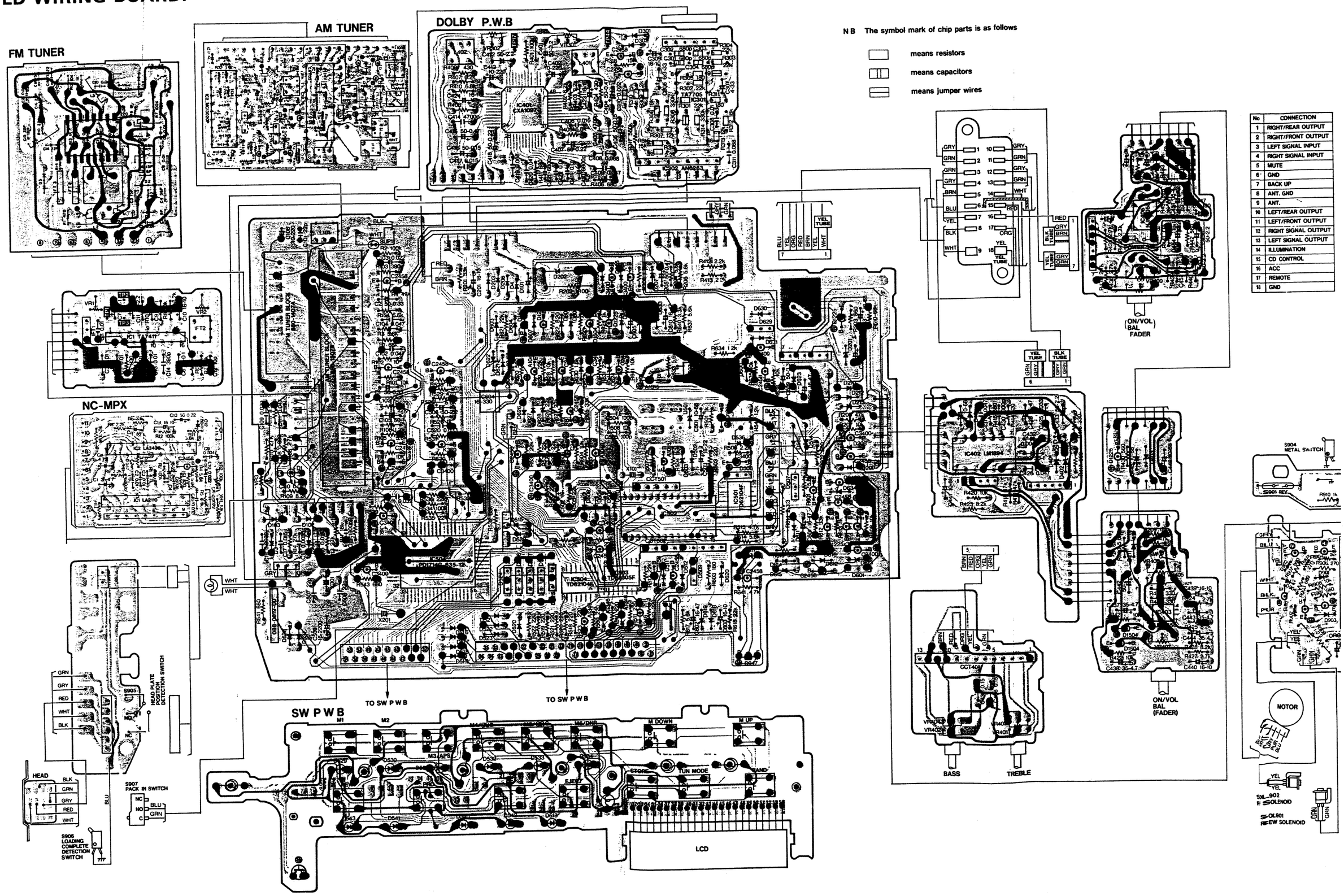


■CIRCUIT DIAGRAM·



1	R R	R L	10
2	F R	F-L	11
3	I IN	R OUT	12
4	MIN	L OUT	13
5	MUTE	ILLUMI	14
6	SIG GND	CD CONT	15
7	BACK-UP	ACC	16
8	ANT GND	REMOTE	17
9	ANT	GND	18

■PRINTED WIRING BOARD:



N B The symbol mark of chip parts is as follows

- means resistors
- means capacitors
- means jumper wires

No	CONNECTION
1	RIGHT/REAR OUTPUT
2	RIGHT/FRONT OUTPUT
3	LEFT SIGNAL INPUT
4	RIGHT SIGNAL INPUT
5	MUTE
6	GND
7	BACK UP
8	ANT. GND
9	ANT.
10	LEFT/REAR OUTPUT
11	LEFT/FRONT OUTPUT
12	RIGHT SIGNAL OUTPUT
13	LEFT SIGNAL OUTPUT
14	ILLUMINATION
15	CD CONTROL
16	ACC
17	REMOTE
18	GND

NB The symbol mark of chip parts is as follows

means resistors

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9	ANT.
10	LEFT/REAR OUTPUT
11	LEFT/FRONT OUTPUT
12	RIGHT SIGNAL OUTPUT
13	LEFT SIGNAL OUTPUT
14	ILLUMINATION
15	CD CONTROL
16	ACC
17	REMOTE
18	GND

(ON/VOL)
BAL
FADER

ON/VOL
BAL
(FADER)

BASS

TREBLE

W PWB

LCD

MOTOR

S903
"FWD DIRECTION"
DETECTION SWITCH

SOL902
FF SOLENOID

SOL901
REW SOLENOID

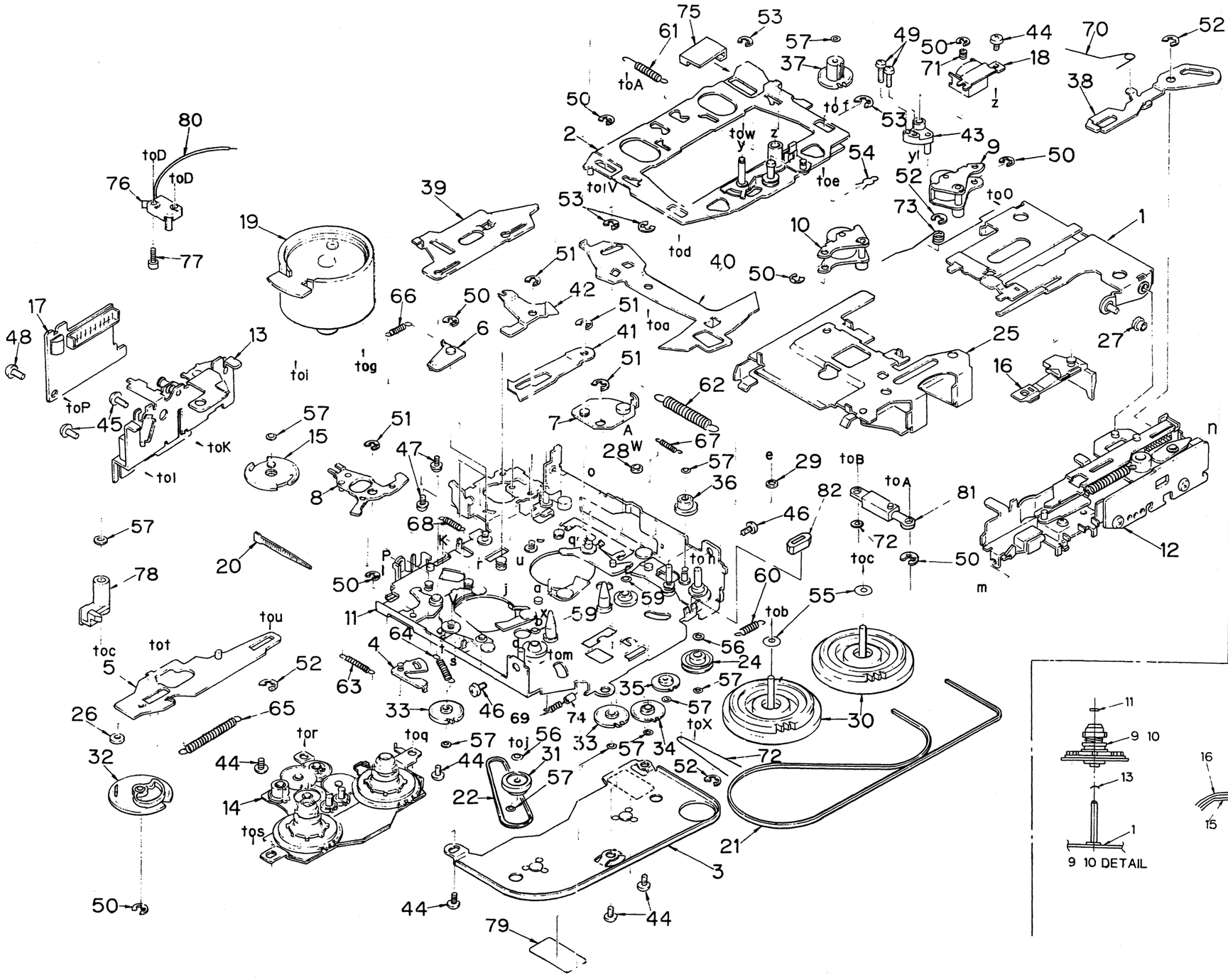
S904
METAL SWITCH

S901 REV

S902 FWD

■EXPLODED VIEW • PARTS LIST

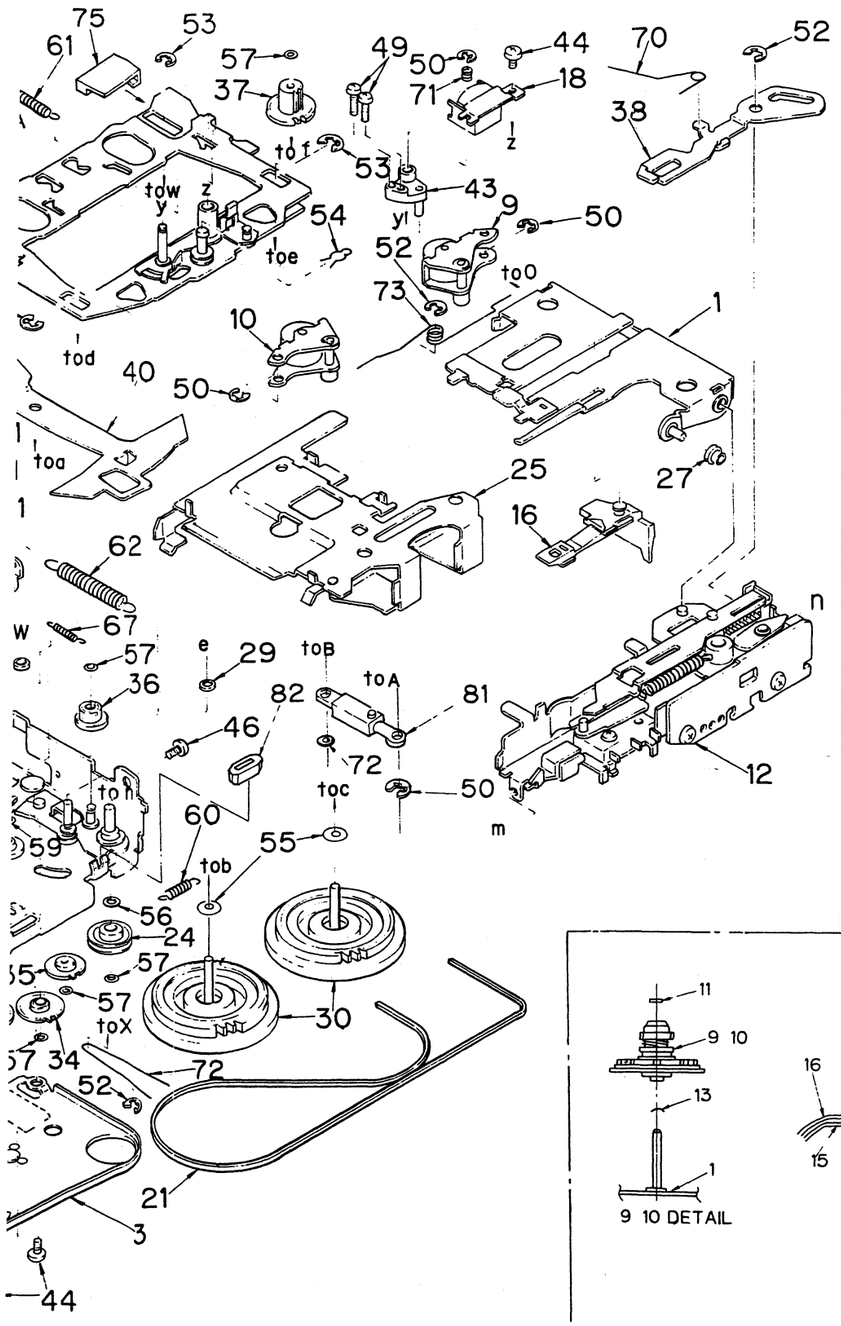
◎Tape mechanism section

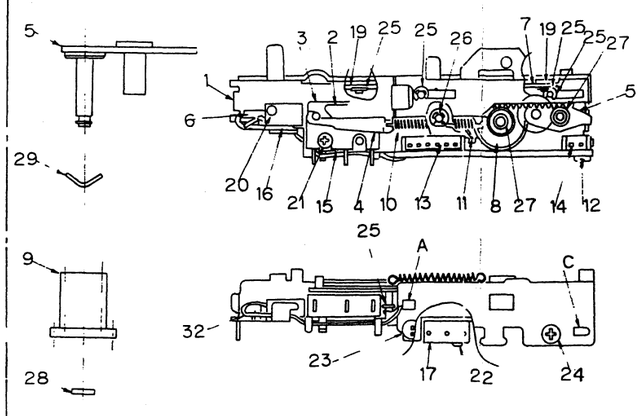


REF NO	PART NO	DESCRIPTION	Q'TY
1	960 3609 05	Guide arm ass'y	1
2	960 3612 07	Head plate ass'y	1
3	960 3617 00	Flywheel P ass'y	1
4	960 3626 02	Timing P ass'y	1
5	960 3627 04	Power P ass'y	1
6	960 3628 01	P lock P ass'y	1

REF NO	PART NO	DESCRIPTION	Q'TY
7	960 3631 06	Power link ass'y	1
8	960 3632 02	REW-link ass'y	1
9	960 3738 01	Roller F ass'y	1
10	960 3739 01	Roller R ass'y	1
11	960 3638 12	Deck plate ass'y	1
12	960 3639 06	Frame sub ass'y	1

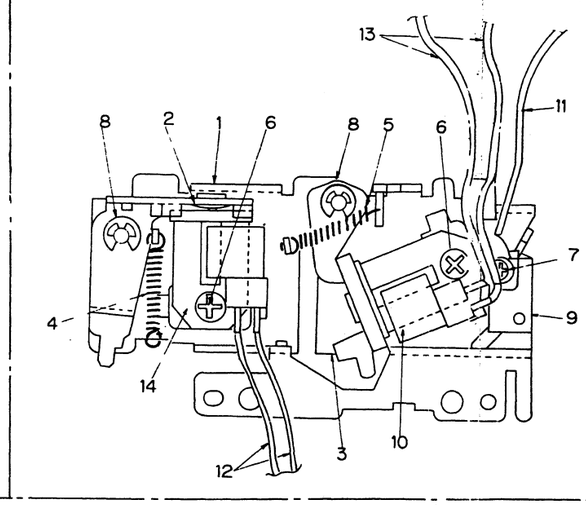
REF





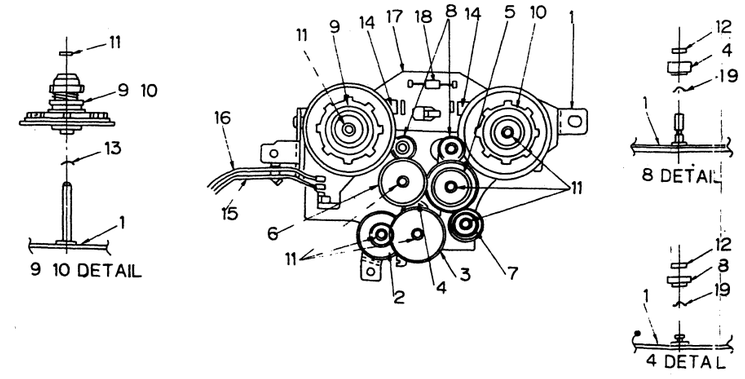
12 960-3639-06 Frame sub ass y

NO	PART NO	DESCRIPTION	Q'TY
1	960 3611 04	FRAME ASS'Y	1
2	960 3619 03	EJ ARM P ASS'Y	1
3	630 1758 03	EJ RACK PLATE	1
4	960 3621 02	SW LINK ASS'Y	1
5	960 3620 05	SWING P ASS'Y	1
6	820 3005 02	VINYL TUBE	1
7	960 3618 03	EJECT P ASS'Y	1
8	613 0076 02	EJECT GEAR	1
9	613 0075 01	SWING GEAR	1
10	750 2404 00	EJ RACK SPRING	1
11	750 2419 01	EJ GEAR SPRING	1
12	099 7435 02	P W B	1
13	076 0277 06	PLUG	1
14	076 0277 02	PLUG	1
15	013 2690 05	SWITCH	1
16	013 3757 00	SWITCH	1
17	013 3780 00	SWITCH	1
18	806 0607 60	VINYL COAT WIRE	—
19	610 0268 00	EJECT ROLLER	2
20	716 0670 00	SPECIL SCREW	1
21	714 2308 11	MACHINE SCREW(M2.3 - 8)	1
22	716 0656 00	SPECIAL SCREW	1
23	716 0485 00	SPECIAL SCREW	1
24	714 2604 81	MACHINE SCREW(M2.6 - 4)	1
25	743 1500 10	E RING	5
26	743 2000 10	E RING	1
27	746 0761 00	SPECIAL WASHER	2
28	746 0762 00	SPECIAL WASHER	1
29	745 0586 00	SPECIAL WASHER	1



13 960-3640-09 Side P sub ass y

NO	PART NO	DESCRIPTION	Q'TY
1	960 3610 06	SIDE PANEL ASS'Y	1
2	960 3623 05	PL LINK A ASS'Y	1
3	960 3624 06	PL LINK B ASS'Y	1
4	750 2408 00	PL SPRING A	1
5	750 2409 02	PL SPRING B	1
6	714 2606 11	MACHINE SCREW(M2.6 - 6)	2
7	716 0670 00	SCREW	1
8	743 1500 10	E RING	2
9	013 3757 00	SW ITCH	1
10	015 0232 02	PLUNGER	1
11	803 0608 60	VINYL COAT WIRE	1
12	804 0606 60	VINYL COAT WIRE	2
13	805 0609 60	VINYL COAT WIRE	2
14	015 0238 00	PLUNGER	1



14 960-3641-07 Reel B sub ass y

NO	PART NO	DESCRIPTION	Q'TY
1	960 3613 05	REELBASE P ASS'Y	1
2	613 0061 01	POWER GEAR A	1
3	613 0062 00	POWER GEAR B	1
4	613 0066 01	P IDLER GEAR	1
5	613 0063 00	POWER GEAR C	1
6	613 0064 01	POWER GEAR D	1
7	613 0065 00	POWER GEAR E	1
8	613 0069 00	IDLER GEAR	2
9	960 3634 02	REELBASE F ASS'Y	1
10	960 3635 02	REELBASE R ASS'Y	1
11	746 0761 00	SPECIAL WASHER	7
12	746 0762 00	SPECIAL WASHER	3
13	746 0712 01	SPECIAL WASHER	2
14	013 3707 00	SWITCH	2
15	802 0615 60	VINYL COAT WIRE	1
16	801 0615 60	VINYL COAT WIRE	1
17	099 7216 02	P W B	1
18	111 1021 91	FILM RESISTOR(1/4W 5.1k Ω)	1
19	745 0678 01	SPECIAL WASHER	3

REF NO	PART NO	DESCRIPTION	Q'TY
1	960 3609 05	Guide arm ass'y	1
2	960 3612 07	Head plate ass'y	1
3	960 3617 00	Flywheel P ass'y	1
4	960 3626 02	Timing P ass'y	1
5	960 3627 04	Power P ass'y	1
6	960 3628 01	P lock P ass'y	1

REF NO	PART NO	DESCRIPTION	Q'TY
7	960 3631 06	Power link ass'y	1
8	960 3632 02	REW-link ass'y	1
9	960 3738 01	Roller F ass'y	1
10	960 3739 01	Roller R ass'y	1
11	960 3638 12	Deck plate ass'y	1
12	960 3639 06	Frame sub ass'y ⑫	1

REF NO	PART NO	DESCRIPTION	Q'TY
13	960 3640 09	Side P sub ass'y ⑬	1
14	960 3641 07	Reel B sub ass'y ⑭	1
15	960 3642 03	CH gear ass'y	1
16	960 3643 02	Pack ST ass'y	1
17	099 7670 03	P W B	1
18	011 0304-00	Head	1

REF NO	PART NO	DESCRIPTION	Q'TY
19	SMA 105 100	Motor ass'y	1
20	335 0833 01	Clamp	1
21	602 0097 00	Belt A	1
22	602 0098 02	Belt B	1
23	750 2421 00	Change A spring	1
24	604 0033 00	Tension pulley	1
25	606 0079 06	Pack guide	1
26	610 0266 00	Cam roller	1
27	610 0267 00	Guide roller	1
28	610 0281 00	Head P roller	1
29	610 0282 00	H-P roller B	1
30	611 0072 02	Flywheel	2
31	613 0060 02	Pulley gear	1
32	613 0067 05	Cam gear	1
33	613 0070 00	FF gear	2
34	613 0071 00	Loading gear A	1
35	613 0072 00	Loading gear B	1
36	613 0073 00	Loading gear C	1
37	613 0074 00	Loading gear D	1
38	630 1759 03	Eject arm	1
39	630 1760 02	Change plate	1
40	630 1761 00	Change arm	1
41	630 1762 02	Head lock plate	1
42	630 1763 01	FF link	1
43	631 0461 01	Azimuth link	1
44	714 2003 81	Machine screw (M2x3)	6
45	714 2603 81	Machine screw (M2.6x3)	2
46	714 2604 81	Machine screw (M2.6x4)	2
47	716 0347 00	Screw (MOTOR)	2
48	716 0485 00	Screw (P W B)	1
49	716 0654 01	Screw (AZIMUTH)	2
50	743 1500 10	E ring (M1.5)	8
51	743 2000 10	E ring (M2)	4
52	743 2500 10	E ring (M2.5)	4
53	744 0031 10	E ring	4
54	744 0028 00	Snap retainer	1
55	745 0646 00	Washer (FLYWHEEL)	2
56	746 0624 00	Washer	2
57	746 0761 00	Washer	10
59	746 0747 00	Washer (BEARING)	2
60	750 2405 02	Loading spring	1
61	750 2406 03	Head P spring	1
62	750 2407 03	P link spring	1
63	750 2410 00	G lock spring	1
64	750 2411 00	Timing spring	1
65	750 2412-00	Power P spring	1
66	750 2413 00	P lock spring	1
67	750-2414 02	FF spring	1
68	750 2415 01	REW-spring	1
69	750 2416 01	Brake spring	1
70	750 2418 02	EJ-arm spring B	1
71	750 2420 00	Azimuth spring	1
72	746 0762 00	Washer	1
73	750 2422 03	Roller spring	1
74	820 4006 02	Vinyl tube	1
75	631 0540 00	Stopper B	1
76	013 3757 00	Switch	1
77	716 0670 00	Screw	1
78	631 0528 01	Sensor link	1
79	290 4065 01	Care label	1
80	804 0608 60	Vinyl coat	1
81	960-3824 00	Dumper ass'y	1
82	631 0539 00	Stopper A	1